

PRO V&V



700 Boulevard South
Suite 102
Huntsville, AL 35802
Phone (256)713-1111
Fax (256)713-1112

Test Report for EAC 2005 VVSG Certification Testing Unisyn Voting Solutions OpenElect 1.3.0.2 Voting System

EAC Project Number: UNS1602

Version: Initial Release

Date: 02/21/2017

U.S. Election Assistance Commission

VSTL

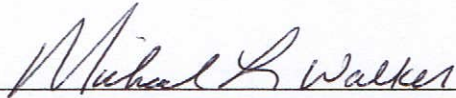
EAC Lab Code 1501

NVLAP[®]

NVLAP LAB CODE 200908-0

SIGNATURES

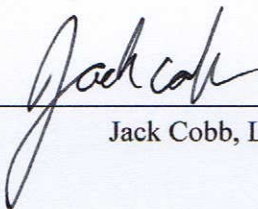
Approved by:



Michael Walker, VSTL Project Manager

2-21-17
Date

Approved by:



Jack Cobb, Laboratory Director

2-21-17
Date

REVISIONS

Revision	Description	Date
NR	Initial Release	02/21/17

TABLE OF CONTENTS

1.0	INTRODUCTION.....	1
1.1	Description and Overview of EAC Certified System Being Modified	1
1.2	References.....	9
1.3	Terms and Abbreviations.....	10
2.0	CERTIFICATION TEST BACKGROUND	11
2.1	Revision History	11
2.2	Scope of Testing	11
2.2.1	Modification Overview	12
2.2.2.1	Modification Overview	12
2.2.2	Block Diagram.....	14
2.2.3	Supported Languages.....	15
2.2.4	VVSG	15
2.2.5	RFIs.....	16
2.2.6	NOCs	16
3.0	TEST FINDINGS AND RECOMMENDATION.....	16
3.1	Summary Findings and Recommendation	16
3.1.1	Hardware Testing	17
3.1.2	System Level Testing	19
3.1.3	Source Code Review	20
3.2	Anomalies and Resolutions.....	21
3.3	Deficiencies and Resolutions.....	21
4.0	RECOMMENDATION FOR CERTIFICATION.....	21
 APPENDIX A. PENNSYLVANIA TEST CASES		A-1
APPENDIX B. ADDITIONAL FINDINGS		B-1
APPENDIX C. AS-RUN TEST PLAN		C-1

1.0 INTRODUCTION

The purpose of this Test Report is to document the procedures that Pro V&V, Inc. followed to perform certification testing during a system modification campaign for the Unisyn Voting Solutions OpenElect Voting System (OVS) Version 1.3.0.2 to the requirements set forth for voting systems in the U.S. Election Assistance Commission (EAC) 2005 Voluntary Voting System Guidelines (VVSG), Version 1.0. Prior to submitting the voting system for testing, Unisyn submitted an application package to the EAC for certification of the OpenElect 1.3.0.2 Voting System modification to the previously certified OVS 1.3 Voting System (Certification Number: 04211950-1.3). The application was accepted by the EAC and the project was assigned the unique Project Number of UNS1602.

1.1 Description and Overview of EAC Certified System Being Modified

The EAC Certified System that is the baseline for the submitted modification is described in the following subsections. All information presented was derived from the previous Certification Test Report, the EAC Certificate of Conformance and/or the System Overview.

The OVS consists of the following components:

- **OpenElect Central Suite (OCS)**
- **OpenElect Voting Optical (OVO)**
- **OpenElect Voting Interface (OVI-7)**
- **OpenElect Voting Interface (OVI-VC)**
- **OpenElect Voting Central Scan (OVCS)**

Open Elect Central Suite (OCS)

The OCS System supports elections on the OVO, OVI-VC, OVI-7 and OVCS systems. It includes Ballot Layout Manager, Election Manager, Election Server, Tabulator Client, Tabulator Server, Adjudicator, and Tabulator Reports. In addition, the OCS includes the Software Server (SS) system for updating and validating the OVO, the OVI-7 and the OVI-VC (voting device) software.

OpenElect Voting Optical (OVO)

The OVO is a full-page dual-sided optical scan precinct scanner that scans and validates voter ballot pages and provides a summary of all ballot pages cast. The OVO consists of the following components:

- **Personal Computer (PC)** - Computer component (with a touch panel display) has pre-installed server software (that manages data and communication) and client software that provides a user interface for voting and maintenance.

A new election loaded via the Election Server or manually via a Transport Media (TM) sets passwords, parameters, and ballot styles for that election. (Valid ballots for a poll location are reinitialized or set on Election Day startup by scanning a ballot header card).

- **Transport Media (TM)** – 1 GB or larger USB thumb drive that provides the means of transporting audit, optional ballot page images and vote files from the precinct on Election Night to Election Headquarters where the central count system resides.
- **Ballot Reader** - Dual-sided scanner connected to the PC to scan data from marked ballot pages. The Ballot Reader ejects accepted ballot pages into an attached ballot box or rejects unaccepted ballot pages back out to the voter.
- **Printer** - 58 mm thermal receipt printer connected to the PC to print receipts and reports at the OVO.
- **UPS** - Uninterruptible power supply is provided as part of the system.

OpenElect Voting Interface (OVI-7)

The OVI-7 is a ballot marking device (BMD) that supports both ADA, and regional Early Voting requirements. The OVI-7 has a 7-inch display and consists of the following components:

- **Personal Computer (PC)** - Computer component (with a touch panel display) has pre-installed server software that manages data and communication and client software that provides user interfaces for voting and maintenance. A new election loaded via the Election Server or manually via a Transport Media (TM) sets passwords, parameters, audio, and ballot styles for that election.
- **Transport Media (TM)** - USB device with 1 GB or larger storage provides the means of transporting audit files to the OCS system.
- **Printer** – 82.5 mm thermal receipt printer is connected to the PC to print OVI Ballots and reports at the OVI.
- **UPS** - Uninterruptible power supply is provided as part of the system.

OpenElect Voting Interface (OVI-VC)

The OVI-VC is a ballot marking device (BMD) that supports both ADA and Regional Early Voting requirements. The OVI-VC has a 15-inch display and consists of the following components:

- **Personal Computer (PC)** - Computer component (with a touch panel display) has pre-installed server software that manages data and communication and client software that provides user interfaces for voting and maintenance. A new election loaded via the Election Server or manually via a Transport Media (TM) sets passwords, parameters, audio, and ballot styles for that election.
- **Transport Media (TM)** - USB device with 1 GB or larger storage provides the means of transporting audit files to the OCS system.
- **Printer** – 82.5 mm thermal receipt printer is connected to the PC to print OVI Ballots and reports at the OVI.
- **UPS** - Uninterruptible power supply is provided as part of the system.

OpenElect Voting Central Scan (OVCS)

The OVCS units reside at election headquarters designated to read absentee, provisional or recount ballots in large jurisdictions or read the entire election's ballots at a central count location in smaller jurisdictions. The OVCS also captures Write-In data images and produces a Write-In image report for manual processing upon request. The OVCS system consists of the following components:

- **PC Desktop** – A desktop PC configuration with the following minimum characteristics:
 - PC: 1.8 GHz Processor, 2 GB RAM, 250GB (or larger) Hard Drive, USB Ports, Network Interface Port (Ethernet), CDRW/DVD, Video Port
 - 16:9 LCD
 - Keyboard and Mouse
- **Bulk Scanner** – A dual-sided scanner that is connected to the PC to scan data from marked ballots.

Table 1-1. Baseline (OVS 1.3) Software Components

Firmware/Software	Version
<i>Proprietary</i>	
Adjudicator	1.3.0
Ballot Layout Manager	1.3.0
Common (Library)	1.3.0
Election Manager	1.3.0
Election Server	1.3.0
OCS Installer	1.3.0
Regkey Builder	1.3.0
Software Server	1.3.0
Tabulator	1.3.0
Tabulator Client	1.3.0
Tabulator Reports	1.3.0
OVCS Application	1.3.0
OVI Firmware	1.3.0
OVO Firmware	1.3.0
Scripter	1.3.0
Validator	1.3.0
Logger (Library)	1.3.0

Table 1-2. Baseline (OVS 1.3) OCS and OVCS COTS Software Components

Software	Version	Filename	Hash Value (MD5)
Java SE Development Kit	Development Kit 6 Update 2 for Linux j	jdk-6u2-linux-i586.bin	6a488cb0a161a1c3a541a66e3b076f8e
Java SE Runtime Environment	Runtime Environment 6 Update 2	jre-6u2-linux-i586.bin	0d30636b5cd23e161da5eda9409f02d5

Table 1-3. Baseline (OVS 1.3) COTS Operating System Software Components

Software	Version	Filename	Hash Value (MD5)
Java Cryptography Extension	Jurisdiction Policy Files 6	jce_policy-6.zip	b20f9d6ed14e55d73a5ed204bca01e7a
Apache Tomcat	6.0.13	apache-tomcat- 6.0.13.tar.gz	50442a96332f0ec0cc1fba354f733ad6
PDI Scanner Driver and Libraries for OVCS	2.1.4	PS3_Canon_libraries_2014Aug12A.zip	16ab8c6d0f3aa9190142fd2d34f1c43b
Linux CentOS Distribution for OVS 1.3 (used for the OVO/OVI with old motherboard)	5.0	CentOS-5.0-i386-bin-1of6.iso CentOS-5.0-i386-bin-2of6.iso CentOS-5.0-i386-bin-3of6.iso CentOS-5.0-i386-bin-4of6.iso CentOS-5.0-i386-bin-5of6.iso CentOS-5.0-i386-bin-6of6.iso	f749d7e17fa01604b9956304efba2333; 963258ceafda5c5e6f79be86028b6b3d; a08ec9ccfdc89c24f3d6567219f90c42; b31c239009b780d1c89c311c192e43be ; 0c3990be2271bf44c1495aa0003b5552; 9e6f91a5292f46b02777133765fc03fe
Linux CentOS Distribution (used for the OCS and OVCS)	5.7	CentOS-5.7-i386-bin-DVD.iso	f64544635a0e1198899eb756072622f5
Linux CentOS Distribution (used for the OVO/OVI with new motherboard)	6.3	CentOS-6.3-i386-bin-DVD1.iso	0285160d8ba3cfc720ea55e98e464eac
Linux CentOS Distribution used for OCS and OVCS	6.5	CentOS-6.5- i386-binDVD1.iso	c98e8040b9ac107153fc1757b4874198

Table 1-4. Baseline (OVS 1.3) OVO Third-Party Software (COTS) Components

Software	Version	Filename	Hash Value (MD5)
<i>Common Files</i>			
Java SE Runtime Environment	Runtime Environment 6 Update 2	jre-6u2-linux-i586.bin	0d30636b5cd23e161da5eda9409f02d5
Java Cryptography Extension	Jurisdiction Policy Files 6	jce_policy-6.zip	b20f9d6ed14e55d73a5ed204bca01e7a

Table 1-4. Baseline (OVS 1.3) OVO Third-Party Software (COTS) Components *(continued)*

Software	Version	Filename	Hash Value (MD5)
Apache Tomcat	6.0.13	apache-tomcat-6.0.13.tar.gz	50442a96332f0ec0cc1fba354f733ad6
PDI Scanner Driver and Libraries for OVO	6.3.32	PS3_Canon_libraries_2014Aug12A.zip	16ab8c6d0f3aa9190142fd2d34f1c43b
Citizen Printer for OVO	1.11.2.7	CSA_JPOS11127_setupEN.bin	d150d08693bf7dbe758adf dab94f655d
OpenCSV	2.3	opencsv-2.3-src-withlibs.tar.gz	d3423d8e3b0ae5c899cee32baa17a36f
Jetway J7F2			
openChrome Video Driver	0.2.900-7.el5	xf86-video-openchrome-0.2.900.tar.gz	3e36895eb4b4d61e21aa27d370f151c8
eGalax Touchscreen Driver	3.00.3719	eGalaxTouch-3.00.3719-32b-k26.tar.gz	51c835408093ccfc4055a9eab9537998
FVWM Desktop Window Manager	2.4.19	fvwm-2.4.19.tar.gz	a2fd2c07061303883d6bf89eb2b259ff
Jetway 2550			
Xenarc Touchscreen Driver	2.5.2107	eGTouch_v2.5.2107.Lx.tar.gz	cfb148b3997257ed0e4a8eb3fa6b3932
Linux Kernel	3.4.13	linux-3.4.13.tar.bz2	9c850d00c898ba792f29eb6a5973961c
Bash	4.1.2-15.el6	bash-4.1.2-15.el6_5.2.i686.rpm	3f85b5595b60f655f646aee702398a93
Java SE Runtime Environment	Runtime Environment 6 Update 2	jre-6u2-linux-i586.bin	0d30636b5cd23e161da5eda9409f02d5
Java Cryptography Extension	Jurisdiction Policy Files 6	jce_policy-6.zip	b20f9d6ed14e55d73a5ed204bca01e7a
Apache Tomcat	6.0.13	apache-tomcat-6.0.13.tar.gz	50442a96332f0ec0cc1fba354f733ad6
PDI Scanner Driver and Libraries for OVO	6.3.32	PS3_Canon_libraries_2014Aug12A.zip	16ab8c6d0f3aa9190142fd2d34f1c43b
Citizen Printer for OVO	1.11.2.7	CSA_JPOS11127_setupEN.bin	d150d08693bf7dbe758adf dab94f655d
OpenCSV	2.3	opencsv-2.3-src-withlibs.tar.gz	d3423d8e3b0ae5c899cee32baa17a36f
Jetway J7F2			
openChrome Video Driver	0.2.900-7.el5	xf86-video-openchrome-0.2.900.tar.gz	3e36895eb4b4d61e21aa27d370f151c8
eGalax Touchscreen Driver	3.00.3719	eGalaxTouch-3.00.3719-32b-k26.tar.gz	51c835408093ccfc4055a9eab9537998

Table 1-4. Baseline (OVS 1.3) OVO Third-Party Software (COTS) Components *(continued)*

Software	Version	Filename	Hash Value (MD5)
FVWM Desktop Window Manager	2.4.19	fvwm-2.4.19.tar.gz	a2fd2c07061303883d6bf89eb2b259ff
Jetway 2550			
Xenarc Touchscreen Driver	2.5.2107	eGTouch_v2.5.2107.Lx.tar.gz	cfb148b3997257ed0e4a8eb3fa6b3932
Linux Kernel	3.4.13	linux-3.4.13.tar.bz2	9c850d00c898ba792f29eb6a5973961c
Bash	4.1.2-15.el6	bash-4.1.2-15.el6_5.2.i686.rpm	3f85b5595b60f655f646aee702398a93

Table 1-5. Baseline (OVS 1.3) OVI-7/OVI-VC Third-Party Software (COTS) Components

Software	Version	Filename	Hash Value (MD5)
Common Files			
Java SE Development Kit	Development Kit 6 Update 2 for Linux	jdk-6u2-linux-i586.bin	6a488cb0a161a1c3a541a66e3b076f8e
Java SE Runtime Environment	Runtime Environment 6 Update 2	jre-6u2-linux-i586.bin	0d30636b5cd23e161da5eda9409f02d5
Java Cryptography Extension	Jurisdiction Policy Files 6	jce_policy-6.zip	b20f9d6ed14e55d73a5ed204bca01e7a
RXTX - Library and Jar	2.1-7r2	rxtx-2.1-7-bins-r2.zip	5f21ae633602a24fd3cdd096951476c2
Jetway J7F2			
openChrome Video Driver	0.2.900-7.el5	xf86-video-openchrome-0.2.900.tar.gz	3e36895eb4b4d61e21aa27d370f151c8
eGalax Touchscreen Driver	3.00.3719	eGalaxTouch-3.00.3719-32b-k26.tar.gz	51c835408093ccfc4055a9eab9537998
FVWM Desktop Window Manager	2.4.19	fvwm-2.4.19.tar.gz	a2fd2c07061303883d6bf89eb2b259ff
Jetway 2550			
Xenarc Touchscreen Driver	2.5.2107	eGTouch_v2.5.2107.Lx.tar.gz	cfb148b3997257ed0e4a8eb3fa6b3932
Linux Kernel	3.4.13	linux-3.4.13.tar.bz2	9c850d00c898ba792f29eb6a5973961c

Table 1-6. Baseline (OVS 1.3) Linux Build Machine Third-Party Software (COTS) Components

Software	Version	Filename	Hash Value (MD5)
Java SE Development Kit	Development Kit 6 Update 2 for Linux	jdk-6u2-linux-i586.bin	6a488cb0a161a1c3a541a66e3b076f8e

Table 1-6. Baseline (OVS 1.3) Linux Build Machine Third-Party Software (COTS) Components
(continued)

Software	Version	Filename	Hash Value (MD5)
Java 2 Enterprise Edition	1.3.01	j2sakee-1_3_01-linux.tar.gz	224e9687c73ba48f1186e434368ec9b3
Java Cryptography Extension	Jurisdiction Policy Files 6	jce_policy-6.zip	b20f9d6ed14e55d73a5ed204bca01e7a
Apache Ant	1.7.0	apache-ant-1.7.0- bin.zip	ac30ce5b07b0018d65203fbc680968f5
Jasper Reports	2.0.5	jasperreports-2.0.5-project.zip	b80bd29e4f95f18bd15da65cfd45d1d2
SQL Connector	5.1.7	mysql-connectorjava-5.1.7.zip	f9a8008367f5b25bdec045c54100d5b0
Apache Axis	1.4	axis-bin-1_4.zip	9eda42bf82a274349f18c5affdd93608
Apache Commons Codec	1.3	commons-codeccurrent.zip	c30c769e07339390862907504ff4b300
Apache Commons Http	3.0	commons-httpclient-3.0.zip	42d96b0c7d627a2170fd57280476c8fe
Apache Tag Library	1.1.2	jakarta-taglibsstandard-current.zip	f75c964f1b276b022c24a677ccc17d4d
PDF Help	4.92b23	pdfhelp.jar	f2542f332e5be4549a48f876d63ac915
Javazoom MP3	1.9.4	mp3spi1.9.4.zip	e259e7674d9b19e76f005cee2810e7f5
Citizen Printer for OVO	1.11.2.7	CSA_JPOS11127_setu pEN.bin	d150d08693bf7dbe758adf dab94f655d
PDI Scanner Driver and Libraries for OVO and OVCS	2.1.4, 6.3.32	PS3_Canon_libraries_2014Aug12A.zip	16ab8c6d0f3aa9190142fd2d34f1c43b
RXTX - Library and Jar	2.1-7r2	rxtx-2.1-7-bins-r2.zip	5f21ae633602a24fd3cdd096951476c2
PDI Tool For Verification of Binary File	1.0	VisionX_11202008.EXE	af8905f015c7d7ff730b9f8b0811134b
Fonts for OCS	None	arial.zip; ARIALBD.zip; arialbi.zip; ariali.zip	c7f4d931da264bee5855cbf69630c81d; 589a0d88320f8a33dbcd4f2c1929ebce; b868660de8a00fe20f70970cca275038; 7968209fd0c62466a27fcde0f4104fec
Star 700II Printer	1.4.2_11-b06	starjavapos_linux_20070317.zip	172b1fcfecae654b00463be74efc7fbb

Table 1-7. Baseline (OVS 1.3) OVO Equipment

Equipment	Manufacturer	Model	Serial Number
OVO	Unisyn	OpenElect Voting Optical, Rev. A	UNI000018
OVO	Unisyn	OpenElect Voting Optical, Rev. A	UNI000024
OVO	Unisyn	OpenElect Voting Optical, Rev. E	UNI000029
OVO	Unisyn	OpenElect Voting Optical, Rev. E	UNI000036
OVO	Unisyn	OpenElect Voting Optical, Rev. E	UNI000039
OVO	Unisyn	OpenElect Voting Optical, Rev. E	UNI000049
OVO Ballot Box 1	Unisyn	Plastic Rolling	BB-58650-001
OVO Ballot Box 2	Unisyn	Plastic Rolling	UVSCOV001675 UVSBOT001685
OVO Ballot Box 3	Unisyn	Plastic Rolling	UVSCOV001738 UVSBOT001618
OVO Ballot Box 4	Unisyn	Portable (collapsible corrugated plastic)	CBB001 CBB002
OVO Ballot Box 5	Unisyn	OpenElect Ballot Box Version 3	OEBBV3-001
OVO Ballot Box 6	Unisyn	OpenElect Ballot Box Version 3	OEBBV3-002

Table 1-8. Baseline (OVS 1.3) OVI Equipment

Equipment	Manufacturer	Model	Serial Number
OVI 7"	Unisyn	OpenElect Voting Interface, Rev. F	UNI150041
OVI 7"	Unisyn	OpenElect Voting Interface, Rev. F	UNI150049
OVI 15"	Unisyn	OVI-VC, Rev. A	UNI202111
OVI 15"	Unisyn	OVI-VC, Rev. B	UNI203050
OVI 15"	Unisyn	OVI-VC, Rev. A	UNI203118
OVI 15"	Unisyn	OVI-VC, Rev. A	UNI203232

Table 1-9. Baseline (OVS 1.3) OVCS Equipment

Equipment	Manufacturer	Model	Serial Number
OVI 7"	Unisyn	OpenElect Voting Interface, Rev. F	UNI150041

Table 1-10. Baseline (OVS 1.3) OCS Configurations

Equipment	Manufacturer/Model	Hardware Specifications	Service Tag	Software Config.
PC 1	Dell Precision T3600	Processor: Intel Xeon E5-1620 3.6GHz Memory: 4x 4GB 1600MHz RAM Hard Drive Capacity: 500GB (Mirrored)	CP7GGX1	OVCS/ All OCS applications
PC 2	Dell OptiPlex 7010	Processor: Intel Core i7-3770 3.4GHz Memory: 4x 4GB 1600MHz RAM Hard Drive Capacity: 500GB	2Y7BGX1	All OCS applications
PC 3	Dell D075	Processor: Intel Core i7-4770S 3.1GHz Memory: 2x 8GB 1600MHz RAM Hard Drive Capacity: 500GB	H407GZ1	All OCS applications

Table 1-10. Baseline (OVS 1.3) OCS Configurations *(continued)*

Equipment	Manufacturer/ Model	Hardware Specifications	Service Tag	Software Config.
Laptop 1	Dell Latitude E5540	Processor: Intel Core i7-4600U 2.1GHz Memory: 2x 4GB 1600MHz RAM Hard Drive Capacity: 500GB	CH78VZ1	All OCS applications
Laptop 2	HP 2000 Notebook PC	Processor: AMD Dual-Core E1- 1500 1.48GHz Memory: 1x 4GB DDR3 SDRAM Hard Drive Capacity: 320GB	2C32NR	All OCS applications

The materials required for testing of the OVS 1.3.0.2 System included all materials to enable the test campaign to occur. This included the applicable hardware and software as well as the TDP, test support materials, and deliverable materials as identified by Unisyn.

1.2 References

- Election Assistance Commission 2005 Voluntary Voting System Guidelines (VVSG) Version 1.0, Volume I, “Voting System Performance Guidelines”, and Volume II, “National Certification Testing Guidelines”
- Election Assistance Commission Testing and Certification Program Manual, Version 2.0
- Election Assistance Commission Voting System Test Laboratory Program Manual, Version 2.0
- National Voluntary Laboratory Accreditation Program NIST Handbook 150, 2006 Edition, “NVLAP Procedures and General Requirements (NIST Handbook 150)”, dated February 2006
- National Voluntary Laboratory Accreditation Program NIST Handbook 150-22, 2008 Edition, “Voting System Testing (NIST Handbook 150-22)”, dated May 2008
- United States 107th Congress Help America Vote Act (HAVA) of 2002 (Public Law 107-252), dated October 2002
- Pro V&V, Inc. Quality Assurance Manual, Revision 7.0
- Election Assistance Commission “Approval of Voting System Testing Application Package” letter dated November 03, 2016
- EAC Requests for Interpretation (RFI) (listed on www.eac.gov)
- EAC Notices of Clarification (NOC) (listed on www.eac.gov)
- Unisyn Voting Solutions Technical Data Package (*A listing of the OpenElect 1.3.0.2 documents submitted for this test campaign is listed in Section 3.1 of this Test Report*)

- NTS Test Report No. PR030407-01, Rev. B
- Nemko USA, Inc., EMC Test Report for the Unisyn Voting Solutions Model: OVI-VC/OVO, Report Number 2016 11318009 EMC R3, Project Number: 102107271

1.3 Terms and Abbreviations

This subsection lists terms and abbreviations relevant to the hardware, the software, or this Test Plan.

“ADA” – Americans with Disabilities Act 1990

“BMD” – Ballot Marking Device

“CM” – Configuration Management

“COTS” – Commercial Off-The-Shelf

“DRE” – Direct Record Electronic

“EAC” – United States Election Assistance Commission

“EMS” – Election Management System

“FCA” – Functional Configuration Audit

“NOC” – Notice of Clarification

“NTS” – National Technical Systems

“OVCS” – OpenElect Voting Central Scan

“OVI-7” – OpenElect Voting Interface

“OVI-VC” – OpenElect Voting Interface

“OVO” – OpenElect Voting Optical

“OVS” – OpenElect Voting System

“PA” – Pennsylvania

“PCA” – Physical Configuration Audit

“QA” – Quality Assurance

“RFI” – Request for Interpretation

“TDP” – Technical Data Package

“UPS” – Uninterruptible Power Supply

“VSTL” – Voting System Test Laboratory

“VVSG” – Voluntary Voting System Guidelines

2.0 CERTIFICATION TEST BACKGROUND

2.1 Revision History

The OVS 1.3.0.2 is a modification to the previously certified OVS 1.3 Voting System (Certification Number: 04211950-1.3). The results of testing for the previously certified version are provided in NTS Test Report No. PR030407-01, Rev. B. This report is available for viewing on the EAC’s website at www.eac.gov.

The only change made to the functionality of the voting system was the update concerning the Pennsylvania Straight Party Method of voting. There were no changes made to the system limits, the software system functions, or the supported languages of the voting system. These remain unchanged from the previously certified version.

2.2 Scope of Testing

Pro V&V performed an evaluation of the results from the previous test campaign along with the changes made to the system to determine the scope of testing required for certification of the OVS 1.3.0.2. Based on this evaluation, Pro V&V determined that testing from the previous test campaigns would establish the baseline and that the focus of this test campaign would be on the system update. The following evaluations were performed to verify compliance of the modifications:

- Limited TDP Review
A limited TDP Review was performed to ensure that all submitted modifications were accurately documented and that the documents met the requirements of the EAC 2005 VVSG.
- Physical Configuration Audit (PCA)
A PCA was performed to compare the voting system submitted for certification testing to the manufacturer’s technical documentation. The purpose of the PCA was to verify that the submitted hardware was unmodified from the previously certified voting system.
- Source Code Review, Compliance Build, Trusted Build, and Build Document Review
The source code review performed was based on the source code changes made since the previous system was certified.
- Functional Configuration Audit (execution of the Pennsylvania Test Cases for BMD and Optical Scanner)
The FCA for this test campaign included an assessment of the submitted modifications and included inputs of both normal and abnormal data during test performance. This evaluation utilized baseline test cases as well as specifically designed test cases and included predefined election definitions for the input data.

- System Integration Test

The system integration tests were performed to insure the OVS 1.3.0.2 functioned as a complete system testing both Straight Party and Pennsylvania Straight Party Method of voting, including the Pennsylvania Certification General Election, Pro V&V's Gen 1 General Election and Pro V&V's Prim 1 Primary election.

- Electrical Hardware Testing of the OVO and OVI

Electrical hardware testing was performed on both the OVO and OVI to ensure changes to the system did not alter the system performance under these conditions.

2.2.1 Modification Overview

The submitted modification for this test campaign consisted of an update to the Pennsylvania Straight Party method of voting on the OVI. This update is documented in the Unisyn 1.3.0.2 Enhancement Report dated 11-28-2016.

2.2.1.1 Detailed List of Changes

Descriptions of the submitted updates, as taken from the Unisyn documentation, are described below:

- If the jurisdiction selects 'PA Straight Ticket' option in the Election Manager application, the contest has some special behaviors if it is populated as the result of a straight ticket election. (PA Straight Ticket being selected automatically sets Auto Deselect as true). In this scenario, if a voter selects a party from the straight ticket selection contest, the ballot is populated in accordance to the rules set by the Election Manager setting. When the voter views a contest that is a vote for 2 or more and touches any candidate, then all the candidates selected in that race because of the straight ticket option are deselected and the candidate that was touched is selected. This occurs even if the candidate belongs to the same party as the party selection in the straight ticket contest.
- The Sound script was updated to explain to the voter what happens when selecting an already selected candidate in an N of M contest. When a vote for two or more is populated from a straight ticket selection, hovering with the keypad over a selected candidate will cause the script to read 'to select this candidate, press the square enter button. Selecting this candidate will deselect all previous selections.'
- Straight ticket selection contest was updated to follow the toggle rule for select/deselect, same as any other vote for one contest.

In addition to the software updates to the Election Manager application and the OVI software, Unisyn submitted hardware modifications. These modifications are described in the OVO OVI Updates Configuration Management document submitted by Unisyn. Table 2-1 contains the updates and brief description of each.

Table 2-1. OVO/OVI Hardware Updates

Item	Reason	OVO	OVI	1.0	1.01	1.1	1.2	1.3	2.0
New Mount for Gate	Improved manufacturing and support	Yes	---	No	NO	NO	Yes /O	Yes /O	Yes /O
Brass Insert for scanner threads	Updating from plastic to brass insert to secure thread	Yes	---	Yes /O	Yes/O	Yes /O	Yes /O	Yes /O	Yes /O
Hole in Plate(s) to access scanner screw	Improve Manufacturing	Yes	---	No	No	No	Yes /O	Yes /O	Yes /O
Citizen Power Supply	New, Federal Level VI efficiency compliant AC/DC adapter	Yes	---	No	No	No	Yes /O	Yes /O	Yes /O
Scanner Power Supply	New, Federal Level VI efficiency compliant AC/DC adapter	Yes	---	No	No	No	Yes /O	Yes /O	Yes /O
PC Power Supply	New, Federal Level VI efficiency compliant AC/DC adapter	Yes	---	No	No	No	Yes /O	Yes /O	Yes /O
PC Power Supply	New, Federal Level VI efficiency compliant AC/DC adapter	---	Yes	No	No	No	Yes /O	Yes /O	Yes /O
Star Printer Power Supply	New, Federal Level VI efficiency compliant AC/DC adapter	---	Yes	No	No	No	Yes /O	Yes /O	Yes /O
G Vision Power Supply	New, Federal Level VI efficiency compliant AC/DC adapter	---	Yes	No	No	No	Yes /O	Yes /O	Yes /O
G Vision LCD	New version of the GVision 15" LCD. All functionality is the same	---	Yes	No	No	No	Yes /O	Yes /O	Yes /O
Flat Cable Ferrite added to Scanner	---	Yes	---	---	---	---	Yes /O	Yes /O	Yes /O
Ferrite added to AC filter Output	---	---	Yes	---	---	---	Yes /O	Yes /O	Yes /O
OVI Reset Button	Added reset button to connect from the board to a switch internal to the OVI	---	Yes	Yes /O	Yes/O	Yes /O	Yes /O	Yes /O	Yes /O
Motherboard Version Update	Vendor updating board	Yes	Yes	No	No	No	Yes /O	Yes /O	Yes /O
Disk Version Update	Moving from 350MBs to 500 MBs - same vendor and version	Yes	Yes	Yes /O	Yes/O	Yes /O	Yes /O	Yes /O	Yes /O
Updated AC Power Cable	Removes the adapter used on the AC cable with a molded connector	Yes	Yes	No	No	No	Yes /O	Yes /O	Yes /O

“O” - Optional

2.2.2 Block Diagram

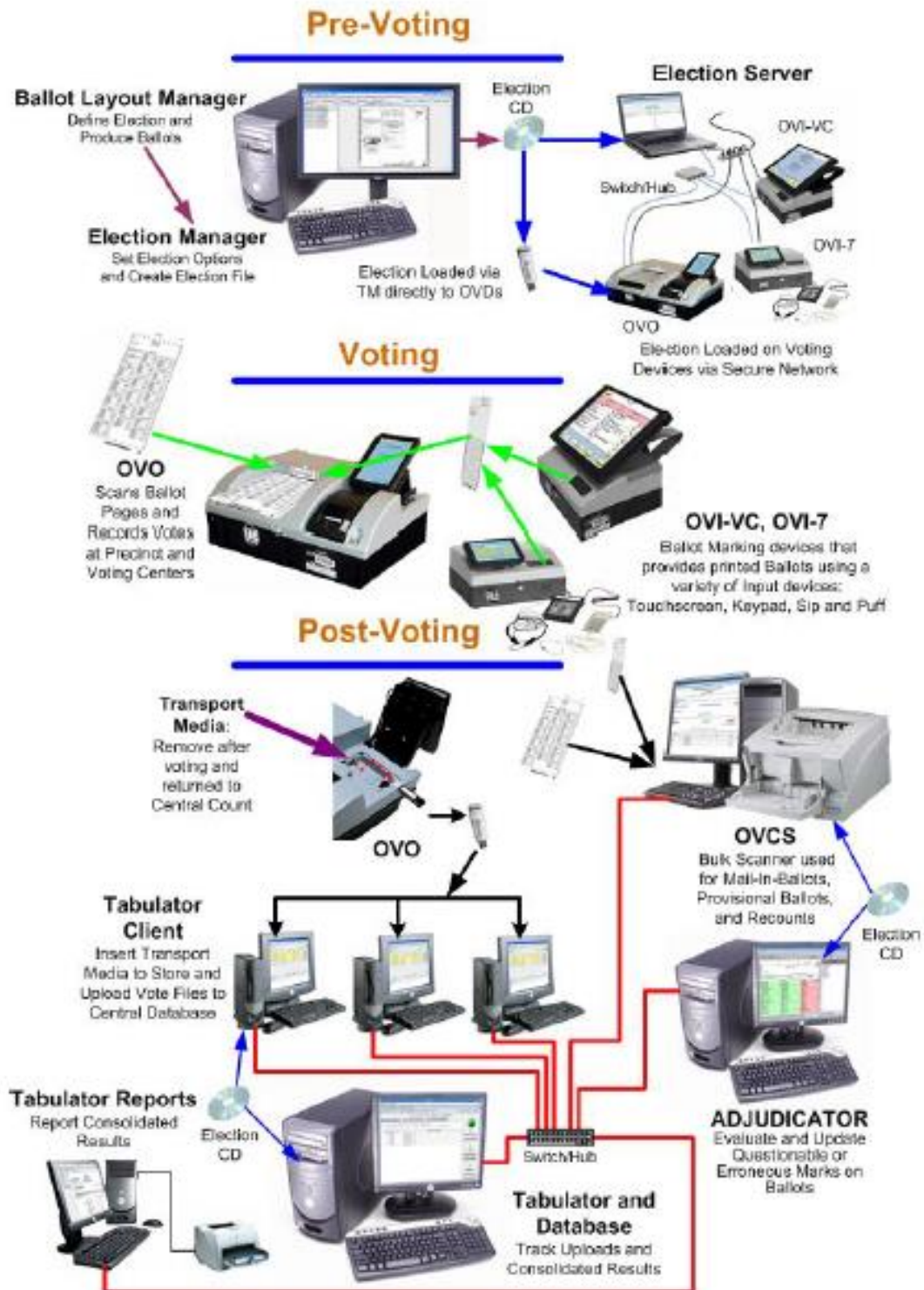


Figure 1-1. OVS 1.3.0.2 System Overview

2.2.3 Supported Languages

The following languages are identified as being supported by the OVS 1.3.0.2 Voting System:

- Armenian
- Cambodian
- Chinese (Cantonese and Mandarin dialects)
- English
- Japanese
- Korean
- Russian
- Spanish
- Tagalog
- Vietnamese

Due to the limited scope of testing, only English ballots were cast during functional testing.

2.2.4 VVSG

The OVS 1.3.0.2 Voting System was evaluated against the relevant requirements contained in the EAC 2005 VVSG, Volumes I and II. All requirements that were excluded from the previous test campaign (OVS 1.3) were also deemed not applicable to this test campaign due to the submitted modifications not impacting the specific requirements. The submitted modifications are mapped to the 2005 VVSG requirements in the table below.

Table 2-2. Modification Requirements Mapping

Modification	Description	Impacted 2005 VVSG Requirement
01	Update to the Pennsylvania Straight Party method of voting on the OVI	Volume II, Section 6.7
02	Straight ticket selection contest was updated to follow the toggle rule for select/deselect, same as any other vote for one contest.	Volume II, Section 6.7
03	Sound script was updated to explain to the voter what happens when selecting an already selected candidate in an N of M contest	Volume II, Section 6.7
TDP	Section 2.2: SYSTEM OVERVIEW, OpenElect Voting System Release 1.3.0.2 System Overview	Volume II, Section 2.2
TDP	Section 2.5: SOFTWARE DESIGN AND SPECIFICATION, OpenElect Voting System Release 1.3.0.2 Trusted Build, Ballot Layout Manager,	Volume II, Section 2.5
TDP	Section 2.10: PERSONNEL DEPLOYMENT AND TRAINING REQUIREMENTS, OpenElect Voting Systems Release 1.3.0.2 System Operations Procedures: Election Day Poll Worker's Guide OVO and OVI, Election Manager User Guide	Volume II, Section 2.10

Pro V&V determined that the OVO and OVCS source code and software had not been changed for this modification; therefore, Pro V&V did not perform an accuracy test as documented in the EAC 2005 VVSG version 1.0. However, the data from all previous testing was analyzed and examined to insure the totals for each test were accurate. Additionally, a cursory evaluation was performed to verify that the Unisyn QA and CM plans are in compliance.

2.2.5 RFIs

There were no RFIs released by the EAC as of the date of test completion that pertained to this test campaign that were not in effect at the time of the baseline system certification.

2.2.6 NOCs

All NOCs released by the EAC as of the date of test completion that pertained to this test campaign and were not in effect at the time of the baseline system certification are listed below:

- NOC 15-01 Test Readiness Review
- NOC 16-02 Trusted Build
- NOC 16-03 Test Case Upload

3.0 TEST FINDINGS AND RECOMMENDATIONS

The OVS 1.3.0.2 Voting System was evaluated against the relevant requirements contained in the EAC 2005 VVSG, Volumes I and II. All requirements that were excluded from the previous test campaign (OVS 1.3) were also deemed not applicable to this test campaign due to the submitted modifications not impacting the specific requirements. To determine the scope of testing for certification of the OVS 1.3.0.2, Pro V&V performed an evaluation of the results from the previous test campaign along with the changes made to the system. Based on this evaluation, Pro V&V determined that testing from the previous test campaigns would establish the baseline and that the focus of this test campaign would be on the system update, as detailed in Section 2.2 of this Test Report. The summary findings and recommendations for each area of testing are provided in the following sections.

3.1 Summary Findings and Recommendation

Summary findings for the Hardware Testing, System Level Testing, and Source Code Review are detailed in the relevant sections of this report. In addition to these areas of testing, a Limited TDP Review and a PCA were performed, both of which are described below.

Limited TDP Review

In order to determine compliance of the modified TDP documents with the EAC 2005 VVSG, a limited TDP review was conducted. This review focused on TDP documents that had been modified since the certification of the baseline system. Any revised documents during the TDP review process were compared with the previous document revision to determine changes made, and the document was re-reviewed to determine whether subject requirements had been met.

A listing of all documents reviewed during the OVS 1.3.0.2 test campaign is provided below:

- OpenElect Voting System Release 1.3.0.2 Trusted Build – Applications 1.3.0.2, Document Number: 04-00553, Version 1.17
- OpenElect Central Suite Ballot Layout Manager Release 1.3 Ballot Layout Manager UserGuide Document Number: 04-00428, Version 1.0
- OpenElect Central Suite Election Manager Release 1.3.0.2 Election Manager User Guide Document Number: 04-00427, Version 1.0
- OpenElect Voting Systems Release 1.3.0.2 System Operations Procedures: Election Day Poll Worker’s Guide OVO and OVI Document Number: 04-00463, Version 1.0
- OpenElect Voting System Release 1.3.0.2 System Overview Document Number: 04-00446, Version 1.0

Physical Configuration Audit (PCA)

A PCA was performed to compare the voting system submitted for certification testing to the manufacturer’s technical documentation. The purpose of the PCA was to verify that the submitted hardware was unmodified from the previously certified voting system.

3.1.1 Hardware Testing

Previous hardware examinations were performed on the certified baseline system (OVS 1.3). The updates to the modified system (OVS 1.3.0.2) required no additional environmental hardware testing to be performed; however, the updates did require additional electrical hardware testing to be performed on the OVI and OVO units to ensure changes to the system did not alter the system performance under these conditions. A listing of these tests is provided below.

- Electrical Power Disturbance
- Electromagnetic Radiation
- Electrostatic Disruption
- Electromagnetic Susceptibility
- Electrical Fast Transient
- Lightning Surge
- Conducted RF Immunity
- Magnetic Fields Immunity
- Electrical Supply

Pro V&V utilized a third-party test facility for performance of the electrical tests. All pre/post-tests were conducted by Pro V&V personnel. The equipment configurations tested are identified below:

OVI-VC Test Configuration
S/N: UVS211027
Support UPS: Minuteman Power
Technologies, ETR1500, S/N:
AE58080900496

OVO Test Configuration
S/N: UVS000036
Support UPS: Minuteman Power
Technologies, ETR1500, S/N:
AE58080900498

During Emissions and Immunity testing, the OVI was configured to continuously play audio and the OVO was configured to continuously scan ballots in a “shoeshine” mode.

Summary Findings

This section contains a summary of the test results, as taken from the Nemko USA, Inc., EMC Test Report presented in Appendix B.

- Electrical Power Disturbance

Test Methods	Minimum Criterion Level	Criterion Level Tested	Compliance Status
IEC 61000-4-11: 1994-06 Power Disturbance	Criterion B and C Voltage Dips of 30% and 60%; Interruptions of >95%, Surges $\pm 15\%$, Power increase +7.5% and Power reductions -12.5%	Criterion B and C Voltage Dips of 30% and 60%; Interruptions of >95%, Surges $\pm 15\%$, Power increase +7.5% and Power reductions -12.5%	PASS

- Electromagnetic Radiation

Test Methods	Frequency Range	Compliance Status
FCC 15B, Sec. 107, Class “B” Conducted Emissions	0.15 MHz – 30 MHz	PASS
FCC 15B, Sec. 109, Class “B” Radiated Emissions	30 MHz – 18 GHz	PASS

- Electrostatic Disruption

Test Methods	Minimum Criterion Level	Criterion Level Tested	Compliance Status
IEC 61000-4-2: 2008 Electrostatic Disruption	Criterion B ± 2 , ± 4 , ± 8 and ± 15 kV Air Discharge, ± 8 kV Contact Discharge	Criterion B ± 2 , ± 4 , ± 8 and ± 15 kV Air Discharge, ± 8 kV Contact Discharge	PASS

- Electromagnetic Susceptibility

Test Methods	Minimum Criterion Level	Criterion Level Tested	Compliance Status
IEC 61000-4-3: 1996 Electromagnetic Susceptibility	Criterion A 10 V/m from 80-1000 MHz (80% AM at 1kHz)	Criterion A 10 V/m from 80-1000 MHz (80% AM at 1kHz)	PASS

- Electrical Fast Transient

Test Methods	Minimum Criterion Level	Criterion Level Tested	Compliance Status
IEC 61000-4-4: 1995-01 Electrical Fast Transient	Criterion B Power line pulses of ± 2 kV	Criterion B Power line pulses of ± 2 kV	PASS

- Lightning Surge

Test Methods	Minimum Criterion Level	Criterion Level Tested	Compliance Status
IEC 61000-4-5: 1995-02 Lightning Surge	Criterion B ±2kV Common mode and Differential mode	Criterion B ±2kV Common mode and Differential mode	PASS

- Conducted RF Immunity

Test Methods	Minimum Criterion Level	Criterion Level Tested	Compliance Status
IEC 61000-4-6: 1996-04 Conducted RF Immunity	Criterion A 150 kHz - 80 MHz at 10 Vrms 1 kHz 80% amplitude modulated	Criterion A 150 kHz - 80 MHz at 10 Vrms 1 kHz 80% amplitude modulated	PASS

- Magnetic Fields Immunity

Upon review of the system change notes, engineering analysis established that Magnetic Fields Immunity Testing (EN 61000-4-8) was not required for retest; therefore, the results of previous test performance were utilized for this test.

- Electrical Supply

Electrical Supply testing was performed on the OVI and the OVO. Fifty votes were cast on the OVI during a 2-hour battery back-up test (25 each hour). Two hundred ballots were processed on the OVO during a 2-hour battery back-up test (100 each hour). Both components successfully completed the test.

3.1.2 System Level Testing

System Level Testing included the Functional Configuration Audit (FCA), the System Integration Test, and the Accuracy Test. The FCA for this test campaign included an assessment of the submitted modifications and included inputs of both normal and abnormal data during test performance. This evaluation utilized baseline test cases as well as specifically designed test cases and included predefined election definitions for the input data. To meet the requirements of the FCA, the Pennsylvania Test Cases for BMD and Optical Scanner were executed. The system integration tests were performed to insure the OVS 1.3.0.2 functioned as a complete system testing both Straight Party and Pennsylvania Straight Party Method of voting, including the Pennsylvania Certification General Election, Pro V&V's Gen 1 General Election and Pro V&V's Prim 1 Primary election.

The OVO and OVCS source code and software was not changed for this modification therefore, Pro V&V did not perform an accuracy test as documented in the EAC 2005 VVSG version 1.0. The data from the previous test performance was analyzed and examined to insure the totals for each test were accurate.

Summary Findings

The FCA included an assessment of the submitted modifications and included inputs of both normal and abnormal data during test performance. This evaluation utilized baseline test cases as well as specifically designed test cases and included predefined election definitions for the input data. The system integration tests were performed to insure the OVS 1.3.0.2 functioned as a complete system testing both Straight Party and Pennsylvania Straight Party Method of voting, including the Pennsylvania Certification General Election, Pro V&V's Gen 1 General Election and Pro V&V's Prim 1 Primary election.

The FCA for this test campaign was completed successfully with no anomalies or deficiencies noted. All system integration tests were successfully executed. The Pennsylvania test cases detailing the results obtained during testing are included in Appendix A.

3.1.3 Source Code Review

Pro V&V reviewed the submitted source code to the EAC 2005 VVSG and the manufacturer-submitted coding standards. Prior to initiating the software review, Pro V&V verified that the submitted documentation was sufficient to enable: (1) a review of the source code and (2) Pro V&V to design and conduct tests at every level of the software structure to verify that design specifications and performance guidelines were met.

Summary Findings

Automated Source Code Review: An Automated Source Code Review was performed on the Election Management component and the OVI component source codes. These were the only components that were changed from 1.3 to 1.3.0.2. No source code issues were found during the Automated Source Code review.

Manual Source Code Review: The Manual Source Code review was performed prior to the Compliance and Trusted Builds. The Manual Source Code was a comparison between the 1.3 and the 1.3.0.2 source code and consisted of 100% of the comments of the modified areas.

Compliance Build: The compliance build was performed following the compliance review. Once the compliance review was performed and the source was deemed stable enough to proceed with testing, the source code and all additional packages were compiled into a Compliance Build.

Trusted Build: The trusted build consisted of inspecting customer submitted source code, COTS, and Third Party software products and combining them to create the executable code. This inspection followed the documented process from the "United States Election Assistance Commission Voting System Test Laboratory Program Manual" Section 5.5 – 5.7. *Performance of the trusted build includes the build documentation review.*

3.2 Anomalies and Resolutions

When a result is encountered during test performance that deviates from what is standard or expected, a root cause analysis is performed. Pro V&V considers it an anomaly if no root cause can be determined. In instances in which a root cause is established, the results are then considered deficiencies. No anomalies occurred during the testing of the OVS 1.3.0.2.

3.3 Deficiencies and Resolutions

Any violation of the specified requirement or a result that is encountered during test performance that deviates from what is standard or expected in which a root cause is established is considered to be a deficiency. Upon occurrence, deficiencies are logged throughout the test campaign in the Pro V&V tracking system (Mantis) and the EAC Virtual Review Tool (VRT) for disposition and resolution. No deficiencies were encountered during the OVS 1.3.0.2 test campaign.

4.0 RECOMMENDATION FOR CERTIFICATION

The OpenElect Voting System (OVS) Version 1.3.0.2, as presented for testing, successfully met the requirements set forth for voting systems in the U.S. Election Assistance Commission (EAC) 2005 Voluntary Voting System Guidelines (VVSG), Version 1.0. Additionally, Pro V&V, Inc. has determined that the OVS 1.3.0.2 functioned as a complete system during testing both the Straight Party and Pennsylvania Straight Party Method of voting, including the Pennsylvania Certification General Election, Pro V&V's Gen 1 General Election and Pro V&V's Prim 1 Primary election. The OVS 1.3.0.2 system proprietary software components are listed in the table below:

Table 4-1. OVS 1.3.0.2 Software Components

Firmware/Software	Version
<i>Proprietary</i>	
Adjudicator	1.3.0
Ballot Layout Manager	1.3.0
Common (Library)	1.3.0
Election Manager	1.3.0.2
Election Server	1.3.0
OCS Installer	1.3.0
Regkey Builder	1.3.0
Software Server	1.3.0
Tabulator	1.3.0
Tabulator Client	1.3.0
Tabulator Reports	1.3.0
OVCS Application	1.3.0
OVI Firmware	1.3.0.2
OVO Firmware	1.3.0
Scripter	1.3.0
Validator	1.3.0
Logger (Library)	1.3.0

APPENDIX A

BMD TEST CASES

Test Case Identifier: 02 – 25 P.S. § 3031.7(2) Selection of Candidates and Questions by Voter (Regular/ADA)	
PA ST 25 P.S. § 3031.7 Requirement:	(2) Provides facilities for voting for such candidates as may be nominated and upon such questions as may be submitted.
Test Objective: To determine if a voter has the ability to select candidates and questions.	Test Configuration: Ballot Marking Device (BMD) and precinct tabulation device are configured as described for normal election day operation by Pennsylvania procedures and/or the device manufacturer.
Test Equipment:	None
Special Procedural Requirements:	None
Assumptions:	An election is loaded on the device and the polls are open, ready for voting.
Step	Description
1000	<p>On the BMD, activate a ballot for voting.</p> <p><i>Expected:</i> The ballot is presented and vote selections can be input.</p> <p><i>Actual:</i> The ballot was presented and vote selections could be input.</p>
1010	<p>Select the first candidate in the first partisan contest excluding a straight party contest.</p> <p><i>Expected:</i> The BMD displays or provides an indication of a vote selection for the first candidate in the first partisan contest excluding a straight party contest.</p> <p><i>Actual:</i> The BMD displayed and provided an indication of a vote selection for the first candidate in the first partisan contest excluding a straight party contest.</p>
1020	<p>Use the designated method to advance the ballot to the first “N of M” contest. Select the first “N” candidates in the contest. (e.g. in a Vote for Two contest the first two candidates would be selected).</p> <p><i>Expected:</i> The BMD advances to the first “N of M” contest. Once selected, the BMD displays or provides an indication of a vote for the first “N” candidates in the first “N of M” contest.</p> <p><i>Actual:</i> The BMD advanced to the first “N of M” contest. Once selected, the BMD displayed and provided an indication of a vote for the first “N” candidates in the first “N of M” contest.</p>
1030	<p>Use the designated method to advance the ballot to the first “Question” contest. Select the “Yes” option in the contest.</p> <p><i>Expected:</i> The BMD advances to the first “Question” contest. Once selected, the BMD displays or provides an indication of a vote selection for the “Yes” option in the first “Question” contest.</p> <p><i>Actual:</i> The BMD advanced to the first “Question” contest. Once selected, the BMD displayed and provided an indication of a vote selection for the “Yes” option in the first “Question” contest.</p>
1040	<p>Use the designated method to advance the ballot to the second “Question” contest. Select the “No” option in the contest.</p> <p><i>Expected:</i> The BMD advances to the second “Question” contest. Once selected, the BMD displays or provides an indication of a vote selection for the “No” option in the second “Question” contest.</p> <p><i>Actual:</i> The BMD advanced to the second “Question” contest. Once selected, the BMD displayed and provided an indication of a vote selection for the “No” option in the second “Question” contest.</p>

1050	<p>Use the designated method to advance the "Ballot Review". Observe the "Ballot Review" to see if the above selections are displayed. Use the designated method to accept the marked ballot. Then, on the precinct tabulation device, cast the voted selections.</p> <p><i>Expected:</i> The BMD advances to the "Ballot Review" screen. After review, the ballot is accepted and is then cast successfully on the precinct tabulation device.</p> <p><i>Actual:</i> The BMD advanced to the "Ballot Review" screen. After review, the ballot was accepted and was then cast successfully on the precinct tabulation device.</p>
1060	<p>Repeat steps 1000- 1050 from above using an ADA input device.</p> <p><i>Expected:</i> Repeat 1000 <u> X </u> Repeat 1010 <u> X </u> Repeat 1020 <u> X </u> Repeat 1030 <u> X </u> Repeat 1040 <u> X </u> Repeat 1050 <u> X </u></p> <p><i>Actual:</i> Steps 1000-1050 from above were repeated using an ADA input device.</p>
1070	<p>Disable voting on the BMD. Close the polls on the precinct tabulation device and print the closed polls report tape.</p> <p><i>Expected:</i> The polls closed and a report is printed.</p> <p><i>Actual:</i> The polls were closed and a report was printed.</p>
1080	<p>Review the closed polls report to ensure all selections input above are recorded and reported correctly.</p> <p><i>Expected:</i> The closed polls report presents the accumulated totals for the selections input above.</p> <p><i>Actual:</i> The closed polls report presented the accumulated totals for the selections input above.</p>
<p>Criteria for Evaluation of the Test Results: The intended selections input above are recorded, stored, and reported as input by the tester.</p>	

Test Case Identifier: 03 – 25 P.S. § 3031.7(3) Straight Party and Pennsylvania Method	
PA ST 25 P.S. § 3031.7 Requirements:	<i>(3) Permits each voter, at other than primary elections, to vote a straight political party ticket by one mark or act and, by one mark or act, to vote for all the candidates of one political party for presidential electors and, by one mark or act, to vote for all the candidates of one political party for every office to be voted for, and every such mark or act shall be equivalent to and shall be counted as a vote for every candidate of the political party so marked including its candidates for presidential electors, except with respect to those offices as to which the voter has registered a vote for individual candidates of the same or another political party or political body, in which case the automatic tabulating equipment shall credit the vote for that office only for the candidate individually so selected, notwithstanding the fact that the voter may not have individually voted for the full number of candidates for that office for which he was entitled to vote.</i>
Test Objective: To determine if the voting system supports straight party voting and the Pennsylvania Method.	Test Configuration: Ballot Marking Device (BMD) and precinct tabulation device configured as described for normal election day operation by Pennsylvania procedures and/or the device manufacturer.
Test Equipment:	None
Special Procedural Requirements:	None
Assumptions:	An election is loaded on the devices and the polls are open, ready for voting.
Step	Description
1000	<p>On the BMD, activate a ballot for voting.</p> <p><i>Expected:</i> The ballot is presented and vote selections can be input.</p> <p><i>Actual:</i> The ballot was presented and vote selections could be input.</p>
1010	<p>Select the option for the first party selection of the straight party.</p> <p><i>Expected:</i> The BMD displays or provides an indication of a vote selection for the first party selection in the straight party contest.</p> <p><i>Actual:</i> The BMD displayed and provided an indication of a vote selection for the first party selection in the straight party contest.</p>
1020	<p>Use the designated method to advance through the ballot to each partisan contest. Observe all partisan contests for the indication of a voter selection for all partisan candidates associated with the first straight party selection.</p> <p><i>Expected:</i> The BMD displays or provides an indication of a vote selection for all the partisan candidates in each contest associated with the first straight party selection.</p> <p><i>Actual:</i> The BMD displayed and provided an indication of a vote selection for all the partisan candidates in each contest associated with the first straight party selection.</p>
1030	<p>Use the designated method to advance through the remainder of the ballots advancing to the ballot review screen. Observe the selection in the ballot review observing only the partisan contests associated with the first straight party selections are present. Use the designated method to accept and mark the ballot. Then, on the precinct tabulating device, use the designated method to cast the voted ballot.</p> <p><i>Expected:</i> The BMD displays or provides an indication of a vote selection for only the partisan contests associated with the first straight party selection. After review, the ballot is accepted and is then cast successfully on the precinct tabulation device.</p> <p><i>Actual:</i> The BMD displayed and provided an indication of a vote selection for only the partisan contests associated with the first straight party selection. After review, the ballot was accepted and was then cast successfully on the precinct tabulation device.</p>

1040	<p>On the BMD, activate a ballot for voting.</p> <p><i>Expected:</i> The ballot is presented and vote selections can be input.</p> <p><i>Actual:</i> The ballot was presented and vote selections could be input.</p>
1050	<p>Select the option for the second party selection of the straight party.</p> <p><i>Expected:</i> The BMD displays or provides an indication of a vote selection for the second party in the straight party contest.</p> <p><i>Actual:</i> The BMD displayed and provided an indication of a vote selection for the second party in the straight party contest.</p>
1060	<p>Use the designated method to advance through the ballot to each partisan contest. Observe all partisan contests for an indication of a voter selection for all partisan candidates associated with the second straight party selection.</p> <p><i>Expected:</i> The BMD displays or provides an indication of a vote selection for all the partisan candidates in each contest associated with the second straight party selection.</p> <p><i>Actual:</i> The BMD displayed and provided an indication of a vote selection for all the partisan candidates in each contest associated with the second straight party selection.</p>
1070	<p>Use the designated method to retreat through the ballot selections to the first "N of M" contest. Select the first partisan candidate that is not the party associated with the second straight party selection. Leave the remainder of the selections under voted.</p> <p><i>Expected:</i> "N" candidates for the party of the second straight party selections should display or provide an indication of the non-selection. The selected candidate should be the only selection displayed or indicated.</p> <p><i>Actual:</i> "N" candidates for the party of the second straight party selections displayed and provided an indication of the non-selection. The selected candidate was the only selection displayed or indicated.</p>
1080	<p>Use the designated method to retreat through the ballot to the "Straight Party" contest. Observe the selection for the second straight party selection.</p> <p><i>Expected:</i> The second straight party selections should be displayed or an indication given as selected.</p> <p><i>Actual:</i> The second straight party selections were displayed or indicated.</p>
1090	<p>Use the designated method to advance through the ballot to the second "N of M" contest. Select the first partisan candidate that is not the party associated with the second straight party selection. Leave the remainder of the selections under voted.</p> <p><i>Expected:</i> "N" candidates for the party of the second straight party selections should display or provide an indication of the non-selection. The selected candidate should be the only selection displayed or indicated.</p> <p><i>Actual:</i> "N" candidates for the party of the second straight party selections were displayed and provided an indication of the non-selection. The selected candidate was the only selection displayed or indicated.</p>

1100	<p>Use the designated method to advance through the remainder of the ballot advancing to the ballot review. Review the selections in the ballot review to verify that the partisan contests associated with the second straight party selections are present with the exception of the "N of M" contests. Use the designated method to accept and mark the ballot. Then, on the precinct tabulation device, use the designated method to cast the voted ballot.</p> <p><i>Expected:</i> The BMD displays or indicates the selection for the partisan contests associated with the second straight party selection for all contests except the first "N of M" contest. The first "N of M" contest displays or indicates the selection of the first candidate that is not associated with the second straight party selection. After review, the ballot is accepted. The ballot is then cast successfully on the precinct tabulation device.</p> <p><i>Actual:</i> The BMD displayed and indicated the selection for the partisan contests associated with the second straight party selection for all contests except the first "N of M" contest. The first "N of M" contest displayed and indicated the selection of the first candidate that is not associated with the second straight party selection. After review, the ballot was accepted. The ballot was then cast successfully on the precinct tabulation device.</p>
1110	<p>On the BMD, activate a ballot for voting.</p> <p><i>Expected:</i> The ballot is presented and vote selections can be input.</p> <p><i>Actual:</i> The ballot was presented and vote selections could be input.</p>
1120	<p>Select the option for the first party selection of the straight party.</p> <p><i>Expected:</i> The BMD displays or provides an indication of a vote selection for the first party in the straight party contest.</p> <p><i>Actual:</i> The BMD displayed and provided an indication of a vote selection for the first party in the straight party contest.</p>
1130	<p>Use the designated method to advance through the ballot to each partisan contest. Observe all partisan contests for an indication of a voter selection for all partisan candidates associated with the first straight party selection.</p> <p><i>Expected:</i> The BMD displays or provides an indication of a vote selection for all the partisan candidates in each contest associated with the first straight party selection.</p> <p><i>Actual:</i> The BMD displayed and provided an indication of a vote selection for all the partisan candidates in each contest associated with the first straight party selection.</p>
1140	<p>Use the designated method to retreat through the ballot selections to the first "N of M" contest. Select the first partisan candidate that is associated with the first straight party selection. Leave this contest and the remainder of the selections under voted.</p> <p><i>Expected:</i> "N" candidates for the party of the first straight party selections should display or provide an indication of the non-selection. The selected candidate should be the only selection displayed or indicated.</p> <p><i>Actual:</i> "N" candidates for the party of the first straight party selections were displayed and provided an indication of the non-selection. The selected candidate was the only selection displayed or indicated.</p>

1150	<p>Use the designated method to advance through the remainder of the ballot advancing to the ballot review. Review the selections in the ballot review to verify that the partisan contests associated with the first straight party selections are present with the exception of the first "N of M" contest. Use the designated method to accept the marked ballot. Then, on the precinct tabulation device, use the designated method to cast the voted ballot.</p> <p><i>Expected:</i> The BMD displays or indicates the selection for the partisan contests associated with the first straight party selection for all contests except the first "N of M" contest. The first "N of M" contest displays or indicates the selection of the second candidate that is associated with the first straight party selection and an under vote. After review, the ballot is accepted and is then cast successfully on the precinct tabulation device.</p> <p><i>Actual:</i> The BMD displayed and indicated the selection for the partisan contests associated with the first straight party selection for all contests except the first "N of M" contest. The first "N of M" contest displayed and indicated the selection of the second candidate that is associated with the first straight party selection and an under vote. After review, the ballot was accepted and was then cast successfully on the precinct tabulation device.</p>
1160	<p>Repeat steps 1000- 1090 from above using an ADA input device.</p> <p><i>Expected:</i> Repeat 1000 <u> X </u> Repeat 1010 <u> X </u> Repeat 1020 <u> X </u> Repeat 1030 <u> X </u> Repeat 1040 <u> X </u> Repeat 1050 <u> X </u> Repeat 1060 <u> X </u> Repeat 1070 <u> X </u> Repeat 1080 <u> X </u> Repeat 1090 <u> X </u></p> <p><i>Actual:</i> Steps 1000-1090 from above were repeated using an ADA input device.</p>
1170	<p>Disable voting on the BMD. Close the polls on the precinct tabulation device and print the closed polls report tape.</p> <p><i>Expected:</i> The polls are closed and a report is printed.</p> <p><i>Actual:</i> The polls were closed and a report was printed.</p>
1180	<p>Review the closed polls report to ensure all selections input above are recorded and reported correctly.</p> <p><i>Expected:</i> The closed polls report presents the accumulated totals for the selections input above.</p> <p><i>Actual:</i> The closed polls report presented the accumulated totals for the selections input above.</p>
<p>Criteria for Evaluation of the Test Results: The intended selections input above are recorded, stored, and reported as input by the tester. The functionality of selecting a candidate of the same party or of a different party of the straight party selection de-selects all candidates for the straight party vote.</p>	

Test Case Identifier: 04 – 25 P.S. § 3031.7(4) Straight Party and Write-In	
PA ST 25 P.S. § 3031.7 Requirements:	<i>(4) Permits each voter, at other than primary elections, to vote a ticket selected from the nominees of any and all political parties, from the nominees of any and all political bodies, and from any persons whose names are not in nomination and do not appear upon the official ballot.</i>
Test Objective: To determine if the voting system supports straight party voting and write-in.	Test Configuration: Ballot Marking Device (BMD) and precinct tabulation device are configured as described for normal election day operation by Pennsylvania procedures and/or the device manufacturer.
Test Equipment:	None
Special Procedural Requirements:	None
Assumptions:	An election is loaded on the devices and the polls are open, ready for voting.
Step	Description
1000	<p>On the BMD, activate a ballot for voting</p> <p><i>Expected:</i> The ballot is presented and vote selections can be input.</p> <p><i>Actual:</i> The ballot was presented and vote selections were input.</p>
1010	<p>Select the option for the first party selection of the straight party.</p> <p><i>Expected:</i> The BMD displays or provides an indication of a vote selection for the first party selection in the straight party contest.</p> <p><i>Actual:</i> The BMD displayed and provided an indication of a vote selection for the first party selection in the straight party contest.</p>
1020	<p>Use the designated method to advance through the ballot to each partisan contest. Observe all partisan contests for a display or indication of a voter selection for all partisan candidates associated with the first straight party selection.</p> <p><i>Expected:</i> The BMD displays or provides an indication of a vote selection for all the partisan candidates in each contest associated with the first straight party selection.</p> <p><i>Actual:</i> The BMD displayed and provided an indication of a vote selection for all the partisan candidates in each contest associated with the first straight party selection.</p>
1030	<p>Use the designated method to advance through the remainder of the ballot advancing to the ballot review screen. Observe the selection in the ballot review observing only the partisan contests associated with the first straight party selections are present. Use the designated method to accept and mark the ballot. Then, on the precinct tabulation device, use the designated method to cast the voted ballot.</p> <p><i>Expected:</i> The BMD displays or provides an indication of the selection for only the partisan contests associated with the first straight party selection. After review, the ballot is accepted and is then cast successfully on the precinct tabulation device.</p> <p><i>Actual:</i> The BMD displayed and provided an indication of the selection for only the partisan contests associated with the first straight party selection. After review, the ballot was accepted and was then cast successfully on the precinct tabulation device.</p>
1040	<p>On the BMD, activate a ballot for regular voting</p> <p><i>Expected:</i> The ballot is presented and vote selections can be input.</p> <p><i>Actual:</i> The ballot was presented and vote selections could be input.</p>

1050	<p>Select the option for the first party selection of the straight party.</p> <p><i>Expected:</i> The BMD displays or provides an indication of a vote selection associated with the first party selection in the straight party contest.</p> <p><i>Actual:</i> The BMD displayed and provided an indication of a vote selection associated with the first party selection in the straight party contest.</p>
1060	<p>Use the designated method to advance to the first partisan contest. Select the write-in option. Input John Doe as the write-in name.</p> <p><i>Expected:</i> The BMD advances to the first partisan contest and allows the input of the "Write-In" candidate John Doe.</p> <p><i>Actual:</i> The BMD advanced to the first partisan contest and allowed the input of the "Write-In" candidate John Doe.</p>
1070	<p>Use the designated method to advance to the ballot review screen. Observe the selections associated with the first straight party selection with the exception of the first partisan contest. Use the designated method to accept and mark the ballot. Then, on the precinct tabulation device, use the designated method to cast the voted ballot.</p> <p><i>Expected:</i> The BMD displays or provides an indication of a vote selection associated with the first party selection in the straight party contest with the exception of the first partisan contest which should indicate the write-in input of John Doe. After review, the ballot is accepted and is then cast successfully on the precinct tabulation device.</p> <p><i>Actual:</i> The BMD displayed and provided an indication of a vote selection associated with the first party selection in the straight party contest with the exception of the first partisan contest which indicated the write-in input of John Doe. After review, the ballot was accepted and was then cast successfully on the precinct tabulation device.</p>
1080	<p>On the BMD, activate a ballot for regular voting</p> <p><i>Expected:</i> The ballot is presented and vote selections can be input.</p> <p><i>Actual:</i> The ballot was presented and vote selections could be input.</p>
1090	<p>Select the option for the first party selection of the straight party.</p> <p><i>Expected:</i> The BMD displays or provides an indication of a vote selection associated with the first party selection in the straight party contest.</p> <p><i>Actual:</i> The BMD displayed and provided an indication of a vote selection associated with the first party selection in the straight party contest.</p>
1100	<p>Use the designated method to advance to the first "Question" contest. Select the "Yes" option. Attempt to over vote by selecting the "No" option. Observe the action of attempting to select the second option.</p> <p><i>Expected:</i> The BMD displays or provides an indication of an attempt to over vote. The precinct tabulation device might disallow the selection and not display any communication.</p> <p><i>Actual:</i> The BMD deselected the "Yes" option and selected the "No" option.</p>

1110	<p>Use the designated method to advance to the ballot review screen. Observe the selections associated with the first straight party selection and "Yes" on the first "Question" contest (unless the device toggled, then "No"). Use the designated method to accept and mark the ballot. Then, on the precinct tabulation device, use the designated method to cast the voted ballot.</p> <p><i>Expected:</i> The BMD displays or provides an indication of a vote selection associated with the first party selection and "Yes" on the first "Question" contest. After review, the ballot is accepted and is then cast successfully on the precinct tabulation device.</p> <p><i>Actual:</i> The BMD displayed and provided an indication of a vote selection associated with the first party selection and "No" on the first "Question" contest. After review, the ballot was accepted and was then cast successfully on the precinct tabulation device.</p>
1120	<p>Repeat steps 1000- 1090 from above using an ADA input device.</p> <p><i>Expected:</i> Repeat 1000 <u> X </u> Repeat 1010 <u> X </u> Repeat 1020 <u> X </u> Repeat 1030 <u> X </u> Repeat 1040 <u> X </u> Repeat 1050 <u> X </u> Repeat 1060 <u> X </u> Repeat 1070 <u> X </u> Repeat 1080 <u> X </u> Repeat 1090 <u> X </u></p> <p><i>Actual:</i> Steps 1000-1090 from above were repeated using an ADA input device.</p>
1120	<p>Disable voting on the BMD. Close the polls on the precinct tabulation device and print the closed polls report tape.</p> <p><i>Expected:</i> The polls closed and a report is printed.</p> <p><i>Actual:</i> The polls were closed and a report was printed.</p>
1130	<p>Review the closed polls report to ensure all selections input above are recorded and reported correctly.</p> <p><i>Expected:</i> The closed polls report presents the accumulated totals for the selections input above.</p> <p><i>Actual:</i> The closed polls report presented the accumulated totals for the selections input above.</p>
<p>Criteria for Evaluation of the Test Results: The intended selections input above are recorded, stored, and reported as input by the tester. The functionality of selecting a write-in candidate functions with a straight party selection.</p>	

Test Case Identifier: 05 – 25 P.S. § 3031.7(5) Selection of Candidate and Write-in	
PA ST 25 P.S. § 3031.7 Requirements:	<i>(5) Permits each voter to vote for any person and any office for whom and for which he is lawfully entitled to vote, whether or not the name of such person appears upon the ballot as a candidate for nomination or election.</i>
Test Objective: To determine if the voting system supports the selection of a candidate and a write-in candidate.	Test Configuration: Ballot Marking Device (BMD) and precinct tabulation device are configured as described for normal election day operation by Pennsylvania procedures and/or the device manufacturer.
Test Equipment:	None
Special Procedural Requirements:	None
Assumptions:	An election is loaded on the devices and the polls are open, ready for voting.
Step	Description
1000	<p>On the BMD, activate a ballot for voting.</p> <p><i>Expected:</i> The ballot is presented and vote selections can be input.</p> <p><i>Actual:</i> The ballot was presented and vote selections could be input.</p>
1010	<p>Select the option for the first candidate in the first partisan contest.</p> <p><i>Expected:</i> The BMD displays or provides an indication of a vote selection for the first candidate selection in the first partisan contest.</p> <p><i>Actual:</i> The BMD displayed and provided an indication of a vote selection for the first candidate selection in the first partisan contest.</p>
1020	<p>Use the designated method to advance through the remainder of the ballot advancing to the ballot review screen. Observe the selection in the ballot review, observing only the first candidate in the first partisan contest is selected. Use the designated method to accept the marked ballot. Then, on the precinct tabulation device, use the designated method to cast the voted ballot.</p> <p><i>Expected:</i> The BMD displays or provides an indication of the selection for only the first candidate selection in first partisan contests. After review, the ballot is accepted and is then cast successfully on the precinct tabulation device.</p> <p><i>Actual:</i> The BMD displayed and provided an indication of the selection for only the first candidate selection in first partisan contests. After review, the ballot was accepted and was then cast successfully on the precinct tabulation device.</p>
1030	<p>On the BMD, activate a ballot for voting.</p> <p><i>Expected:</i> The ballot is presented and vote selections can be input.</p> <p><i>Actual:</i> The ballot was presented and vote selections could be input.</p>
1040	<p>Select the option for a write-in candidate in the first partisan contest. Use the designed method to input "John Doe".</p> <p><i>Expected:</i> The BMD displays or provides an indication of a vote selection for a write-in candidate.</p> <p><i>Actual:</i> The BMD displayed and provided an indication of a vote selection for a write-in candidate.</p>

1050	<p>Use the designated method to advance through the remainder of the ballot advancing to the ballot review screen. Observe the selection in the ballot review observing only the write-in candidate in the first partisan contest is selected. Use the designated method to accept the marked ballot. Then, on the precinct tabulation device, use the designated method to cast the voted ballot.</p> <p><i>Expected:</i> The precinct tabulation device displays or provides an indication of the selection for only the write-in candidate "John Doe" in first partisan contests. After review, the ballot is cast successfully on the precinct tabulation device.</p> <p><i>Actual:</i> The precinct tabulation device displayed and provided an indication of the selection for only the write-in candidate "John Doe" in first partisan contests. After review, the ballot was cast successfully on the precinct tabulation device.</p>
1060	<p>On the BMD, activate a ballot for voting.</p> <p><i>Expected:</i> The ballot is presented and vote selections can be input.</p> <p><i>Actual:</i> The ballot was presented and vote selections could be input.</p>
1070	<p>Select the option for a write-in candidate in the first "N of M" contest. Use the designed method to input "John Doe" for all selections. Observe any activity to preclude the same input.</p> <p><i>Expected:</i> The BMD displays or provides an indication of a duplicate vote selection for a write-in candidate. If no indication is provided, then trace the ability to adjudicate the vote through the entire system. It may require the EMS component to verify.</p> <p><i>Actual:</i> The BMD displayed and provided an indication of a duplicate vote selection for a write-in candidate.</p>
1080	<p>Use the designated method to advance through the remainder of the ballot advancing to the ballot review screen. Observe the selection in the ballot review observing only the write-in candidates in the first "N of M" contest are selected. Use the designated method to accept the marked ballot. Then, on the precinct tabulation device, use the designated method to cast the voted ballot.</p> <p><i>Expected:</i> The precinct tabulation device displays or provides an indication of the selection for only the write-in candidates "John Doe" in first "N of M" contests. After review, the ballot is cast successfully on the precinct tabulation device.</p> <p><i>Actual:</i> The precinct tabulation device displayed and provided an indication of the selection for only the write-in candidates "John Doe" in first "N of M" contests. After review, the ballot was cast successfully on the precinct tabulation device.</p>
1090	<p>Repeat steps 1000- 1050 from above using an ADA input device.</p> <p><i>Expected:</i> Repeat 1000 _____ Repeat 1010 _____ Repeat 1020 _____ Repeat 1030 _____ Repeat 1040 _____ Repeat 1050 _____</p> <p><i>Actual:</i> Steps 1000-1050 from above were repeated using an ADA input device.</p>

1100	<p>Disable voting on the BMD. Close the polls on the precinct tabulation device and print the closed polls report tape.</p> <p><i>Expected:</i> The polls closed and a report is printed.</p> <p><i>Actual:</i> The polls were closed and a report was printed.</p>
1100	<p>Review the closed polls report to ensure all selections input above are recorded and reported correctly.</p> <p><i>Expected:</i> The closed polls report presents the accumulated totals for the selections input above.</p> <p><i>Actual:</i> The closed polls report presented the accumulated totals for the selections input above.</p>
<p>Criteria for Evaluation of the Test Results: The intended selections input above are recorded, stored, and reported as input by the tester. The functionality of selecting a candidate and a write-in candidate functions.</p>	

Test Case Identifier: 07– 25 P.S. § 3031.7(7) Attempt to Over Vote Contests and Questions (Regular/ADA)	
PAST 25 P.S. § 3031.7 Requirements:	<i>(7) If it is of a type that registers the vote electronically, the voting system shall preclude each voter from voting for more persons for any office than he is entitled to vote for or upon any question more than once.</i>
Test Objective: To determine if the voting system allows over voting on contests and questions	Test Configuration: Ballot Marking Device (BMD) and precinct tabulation device configured as described for normal election day operation by Pennsylvania procedures and/or the device manufacturer.
Equipment:	None
Special Procedural Requirements:	None
Assumptions:	An election is loaded on the devices and the polls are open, ready for voting.
Step	Description
1000	<p>On the BMD, activate a ballot for voting.</p> <p><i>Expected:</i> The ballot is presented and vote selections can be input.</p> <p><i>Actual:</i> The ballot was presented and vote selections were input.</p>
1010	<p>Select the first candidate in the first partisan “1 of 1” contest excluding a straight party contest.</p> <p><i>Expected:</i> The BMD displays or provides an indication of a vote selection for the first candidate in the first partisan “1 of 1” contest excluding a straight party contest.</p> <p><i>Actual:</i> The BMD displayed and provided an indication of a vote selection for the first candidate in the first partisan “1 of 1” contest excluding a straight party contest.</p>
1020	<p>Attempt to select the second candidate in the first partisan “1 of 1” contest ensure the contest is the same contest as voted in step 1010. Observe the action of attempting to place a second vote.</p> <p><i>Expected:</i> The BMD displays or provides an indication of an attempt to over vote. The BMD might disallow the selection and not display any communication.</p> <p><i>Actual:</i> The BMD deselected the first candidate and selected the second candidate.</p>
1030	<p>Attempt to select the write-in option. Observe the action of attempting to input a write-in.</p> <p><i>Expected:</i> The BMD displays or provides an indication of a vote selection for the write-in.</p> <p><i>Actual:</i> The BMD displayed and provided an indication of a vote selection for the write-in.</p>
1040	<p>Use the designated method to advance the ballot to the first “N of M” contest. Select the first “N” candidates in the contest. (e.g. in a Vote for Two contest the first two candidates would be selected).</p> <p><i>Expected:</i> The BMD advances to the first “N of M” contest. Once selected, the BMD displays or provides an indication of a vote for the first “N” candidates in the first “N of M” contest.</p> <p><i>Actual:</i> The BMD advanced to the first “N of M” contest. Once selected, the BMD displayed and provided an indication of a vote for the first “N” candidates in the first “N of M” contest.</p>

1050	<p>Attempt to select the "N +1" candidate in the first "N of M" contest ensure the contest is the same contest as voted in step 1040. Observe the action of attempting to place an over vote.</p> <p><i>Expected:</i> The BMD displays or provides an indication of an attempt to over vote. The BMD might disallow the selection and not display any communication.</p> <p><i>Actual:</i> The BMD deselected the last candidate selected and marked the +1 candidate.</p>
1060	<p>Use the designated method to advance the ballot to the first "Question" contest. Select the "Yes" option in the contest.</p> <p><i>Expected:</i> The BMD advances to the first "Question" contest. Once selected, the BMD displays or provides an indication of a vote for the "Yes" option in the first "Question" contest.</p> <p><i>Actual:</i> The BMD advanced to the first "Question" contest. Once selected, the BMD displayed and provided an indication of a vote for the "Yes" option in the first "Question" contest.</p>
1070	<p>Attempt to select the "No" option in the first "Question" contest ensure the contest is the same contest as voted in step 1060. Observe the action of attempting to place an over vote.</p> <p><i>Expected:</i> The BMD displays or provides an indication of an attempt to over vote. The BMD might disallow the selection and not display any communication.</p> <p><i>Actual:</i> The BMD deselected the "Yes" option and selected the "No" option.</p>
1080	<p>Use the designated method to advance the "Ballot Review". Observe the "Ballot Review" to see if the above selections are indicated. Use the designated method to mark the voted selections onto the paper ballot. Use the designated mark to cast the marked ballot on the precinct tabulation device.</p> <p><i>Expected:</i> The ballot marking device advances to the "Ballot Review" screen and marks the selections. After review and ballot is cast successfully.</p> <p><i>Actual:</i> The ballot marking device was advanced to the "Ballot Review" screen and the above selections were indicated. After review and ballot was cast successfully.</p>
1090	<p>Repeat steps 1000- 1070 from above using an ADA input device.</p> <p><i>Expected:</i> Repeat 1000 __X__ Repeat 1010 __X__ Repeat 1020 __X__ Repeat 1030 __X__ Repeat 1040 __X__ Repeat 1050 __X__ Repeat 1060 __X__ Repeat 1070 __X__</p> <p><i>Actual:</i> Steps 1000-1060 from above were repeated using an ADA input device.</p>

1100	<p>Disable the BMD. Close the polls on the precinct tabulation device and print the closed polls report tape.</p> <p><i>Expected:</i> The polls closed and a report is printed.</p> <p><i>Actual:</i> The polls were closed and a report was printed.</p>
1110	<p>Review the closed polls report to ensure all selections input above are recorded and reported correctly.</p> <p><i>Expected:</i> The closed polls report presents the accumulated totals for the selections input above.</p> <p><i>Actual:</i> The closed polls report presented the accumulated totals for the selections input above.</p>
<p>Criteria for Evaluation of the Test Results: The intended selections input above are recorded, stored, and reported as input by the tester. The attempts to select more persons than the vote for and any question more than once are unsuccessful.</p>	

Test Case Identifier: 10 – 25 P.S. § 3031.7(10) Ballot Review and Change (Regular/ADA)	
PA ST 25 P.S. § 3031.7 Requirements:	(10) If it is of a type that registers the vote electronically, the voting system shall permit each voter to change his vote for any candidate or upon any question appearing on the official ballot up to the time that he takes the final step to register his vote and to have his vote computed. If it is of a type that uses paper ballots or ballot cards to register the vote and automatic tabulating equipment to compute such votes, the system shall provide that a voter who spoils his ballot may obtain another ballot; any ballot thus returned shall be immediately cancelled and at the close of the polls shall be enclosed in an envelope marked "Spoiled" which shall be sealed and returned to the county board.
Test Objective: To determine if the voting system allows the voter to review the selections and change a vote selection before cast of the ballot.	Test Configuration: Ballot Marking Device (BDM) and precinct tabulation device configured as described for normal election day operation by Pennsylvania procedures and/or the device manufacturer.
Test Equipment:	None
Special Procedural Requirements:	None
Assumptions:	An election is loaded on the devices and the polls are open, ready for voting.
Step	Description
1000	On the BMD, activate a ballot for voting. <i>Expected:</i> The ballot is presented and vote selections can be input. <i>Actual:</i> The ballot was presented and the vote selections were input.
1010	Select the first candidate in the first all "1 of 1" contest excluding a straight party contest, the first "N" candidates in all "N of M" contests, and select the "Yes" option in all "Question" contests. <i>Expected:</i> The BMD allows for the navigation and the voting inputs to be selected as described above. <i>Actual:</i> The BMD allowed for the navigation and the voting inputs to be selected as described above.
1020	Use the designated method to advance the "Ballot Review". Observe the "Ballot Review" to see if the above selections are indicated. <i>Expected:</i> The BMD advances to the "Ballot Review" screen. The vote selections can be verified. <i>Actual:</i> The BMD advanced to the "Ballot Review" screen. The vote selections were verified.
1030	Use the designated method to retract to the first partisan "1 of 1" contest excluding the straight party contest. <i>Expected:</i> The BMD navigates to the first partisan "1 of 1" contest excluding the straight party contest. <i>Actual:</i> The BMD navigated to the first partisan "1 of 1" contest excluding the straight party contest.
1040	Deselect the first candidate selection and select the second candidate. <i>Expected:</i> The BMD indicates the de-selection of the first candidate and the select of the second candidate. <i>Actual:</i> The BMD indicated the de-selection of the first candidate and the selection of the second candidate.

1050	<p>Use the designated method to advance to the first "Question" contest. De-select the "Yes" option and select the "No" option.</p> <p><i>Expected:</i> The BMD navigates to the first "Question" contest and provides an indication of the de-selection of the "Yes" option and a selection of the "No" option.</p> <p><i>Actual:</i> The BMD navigated to the first "Question" contest and provided an indication of the de-selection of the "Yes" option and a selection of the "No" option.</p>
1060	<p>Use the designated method to advance the "Ballot Review". Observe the "Ballot Review" to see if the above selections are indicated. Use the designated method accept and mark the ballot. Then, on the precinct tabulation device, use the designated method to cast the voted selections.</p> <p><i>Expected:</i> The BMD advances to the "Ballot Review" screen. After review, the ballot is accepted and is then cast successfully.</p> <p><i>Actual:</i> The BMD advanced to the "Ballot Review" screen. After review, the ballot was accepted and was then cast successfully.</p>
1070	<p>Repeat steps 1000- 1060 from above using an ADA input device.</p> <p><i>Expected:</i> Repeat 1000 <u> X </u> Repeat 1010 <u> X </u> Repeat 1020 <u> X </u> Repeat 1030 <u> X </u> Repeat 1040 <u> X </u> Repeat 1050 <u> X </u> Repeat 1060 <u> X </u></p> <p><i>Actual:</i> Steps 1000-1060 from above were repeated using an ADA input device.</p>
1080	<p>Disable voting on the BMD. Close the polls on the precinct tabulation device and print the closed polls report tape.</p> <p><i>Expected:</i> The polls closed and a report is printed.</p> <p><i>Actual:</i> The polls were closed and a report was printed.</p>
1090	<p>Review the closed polls report to ensure all selections input above are recorded and reported correctly.</p> <p><i>Expected:</i> The closed polls report presents the accumulated totals for the selections input above.</p> <p><i>Actual:</i> The closed polls report presented the accumulated totals for the selections input above.</p>
<p>Criteria for Evaluation of the Test Results: The intended selections input above are recorded, stored, and reported as input by the tester. The voter input can be changed by navigating through the ballot after a ballot has been reviewed.</p>	

OPTICAL SCAN TEST CASES

Op Scan

Test Case Identifier: 02 – 25 P.S. § 3031.7(2) Selection of Candidates and Questions by Voter	
PA ST 25 P.S. § 3031.7 Requirement:	(2) Provides facilities for voting for such candidates as may be nominated and upon such questions as may be submitted.
Test Objective: To determine if a voter has the ability to select candidates and questions.	Test Configuration: Optical Scan precinct tabulation device configured as described for normal election day operation by Pennsylvania procedures and/or the device manufacturer.
Test Equipment:	None
Special Procedural Requirements:	None
Assumptions:	An election is loaded on the device and the polls are open. The device is ready to accept ballots for scanning.
Step	Description
1000	Obtain a blank ballot. <i>Expected:</i> The ballot is blank and vote selections can be made. <i>Actual:</i> The ballot was blank and vote selections could be made.
1010	Vote for the first candidate in the first partisan contest excluding a straight party contest. The ballot must be marked in such a way as to meet the manufacturer's given criteria for a mark (for example, the oval must be completely filled in with an appropriate marking utensil). <i>Expected:</i> The ballot indicates a vote selection for the first candidate in the first partisan contest excluding a straight party contest. <i>Actual:</i> The ballot indicated a vote selection for the first candidate in the first partisan contest excluding a straight party contest.
1020	On the first "N of M" contest, select the first "N" candidates in the contest. (e.g. in a Vote for Two contest the first two candidates would be selected) by appropriately marking the ballot. <i>Expected:</i> The ballot indicates a vote for the first "N" candidates in the first "N of M" contest. <i>Actual:</i> The ballot indicated a vote for the first "N" candidates in the first "N of M" contest.
1030	On the first "Question" contest, select the "Yes" option in the contest by appropriately marking the ballot. <i>Expected:</i> The ballot indicates a vote selection for the "Yes" option in the first "Question" contest. <i>Actual:</i> The ballot indicated a vote selection for the "Yes" option in the first "Question" contest.
1040	On the second "Question" contest, select the "No" option in the contest by appropriately marking the ballot. <i>Expected:</i> The ballot indicates a vote selection for the "No" option in the second "Question" contest. <i>Actual:</i> The ballot indicated a vote selection for the "No" option in the second "Question" contest.

Op Scan

1050	<p>Review the ballot to verify that the above selections are marked.</p> <p><i>Expected:</i> The correct selections are marked appropriately.</p> <p><i>Actual:</i> The correct selections were marked appropriately.</p>
1060	<p>Cast the ballot on the Optical Scan precinct tabulation device.</p> <p><i>Expected:</i> The ballot is cast successfully.</p> <p><i>Actual:</i> The ballot was cast successfully.</p>
1070	<p>Close the polls and print the closed polls report tape.</p> <p><i>Expected:</i> The polls closed and a report is printed.</p> <p><i>Actual:</i> The polls were closed and a report was printed.</p>
1080	<p>Review the closed polls report to ensure all selections input above are recorded and reported correctly.</p> <p><i>Expected:</i> The closed polls report presents the accumulated totals for the selections input above.</p> <p><i>Actual:</i> The closed polls report presented the accumulated totals for the selections input above.</p>
<p>Criteria for Evaluation of the Test Results: The intended selections input above are recorded, stored, and reported as input by the tester.</p>	

Op Scan

Test Case Identifier: 03 – 25 P.S. § 3031.7(3) Straight Party and Pennsylvania Method-	
PA ST 25 P.S. § 3031.7 Requirements:	<i>(3) Permits each voter, at other than primary elections, to vote a straight political party ticket by one mark or act and, by one mark or act, to vote for all the candidates of one political party for presidential electors and, by one mark or act, to vote for all the candidates of one political party for every office to be voted for, and every such mark or act shall be equivalent to and shall be counted as a vote for every candidate of the political party so marked including its candidates for presidential electors, except with respect to those offices as to which the voter has registered a vote for individual candidates of the same or another political party or political body, in which case the automatic tabulating equipment shall credit the vote for that office only for the candidate individually so selected, notwithstanding the fact that the voter may not have individually voted for the full number of candidates for that office for which he was entitled to vote.</i>
Test Objective: To determine if the voting system supports straight party voting and the Pennsylvania Method.	Test Configuration: Optical Scan Precinct tabulation device configured as described for normal election day operation by Pennsylvania procedures and/or the device manufacturer.
Test Equipment:	None
Special Procedural Requirements:	None
Assumptions:	An election is loaded on the device and the polls are open, ready for accepting ballots.
Step	Description
1000	Obtain a blank ballot. <i>Expected:</i> The ballot is blank and vote selections can be made. <i>Actual:</i> The ballot was blank and vote selections could be made.
1010	Vote for the option for the first party selection of the straight party. The ballot must be marked in such a way as to meet the manufacturer's given criteria for a mark (for example, the oval must be completely filled in with an appropriate marking utensil). <i>Expected:</i> The ballot indicates a vote selection for the first party selection in the straight party contest. <i>Actual:</i> The ballot indicated a vote selection for the first party selection in the straight party contest.
1020	Review the ballot to verify that the above selection is marked. <i>Expected:</i> The correct selection is marked appropriately. <i>Actual:</i> The correct selection was marked appropriately.
1030	Cast the ballot on the Optical Scan precinct tabulation device. <i>Expected:</i> The ballot is cast successfully. <i>Actual:</i> The ballot was cast successfully.
1040	Obtain a blank ballot. <i>Expected:</i> The ballot is blank and vote selections can be made. <i>Actual:</i> The ballot was blank and vote selections could be made.

Op Scan

1050	<p>Vote for the option for the second party selection of the straight party. The ballot must be marked in such a way as to meet the manufacturer's given criteria for a mark (for example, the oval must be completely filled in with an appropriate marking utensil).</p> <p><i>Expected:</i> The ballot indicates a vote selection for the second party selection in the straight party contest.</p> <p><i>Actual:</i> The ballot indicated a vote selection for the second party selection in the straight party contest.</p>
1060	<p>Review the ballot to verify that the above selection is marked.</p> <p><i>Expected:</i> The correct selection is marked appropriately.</p> <p><i>Actual:</i> The correct selection was marked appropriately.</p>
1070	<p>On the first "N of M" contest, select the first partisan candidate that is not the party associated with the second straight party selection. Leave the remainder of the selections under voted.</p> <p><i>Expected:</i> The selected candidate should be the only selection marked.</p> <p><i>Actual:</i> The selected candidate was the only selection marked.</p>
1080	<p>Review the ballot to verify that the above selections are marked.</p> <p><i>Expected:</i> The correct selections are marked appropriately.</p> <p><i>Actual:</i> The correct selections were marked appropriately.</p>
1090	<p>Obtain a blank ballot.</p> <p><i>Expected:</i> The ballot is blank and vote selections can be made.</p> <p><i>Actual:</i> The ballot was blank and vote selections could be made.</p>
1100	<p>Vote for the option for the first party selection of the straight party. The ballot must be marked in such a way as to meet the manufacturer's given criteria for a mark (for example, the oval must be completely filled in with an appropriate marking utensil).</p> <p><i>Expected:</i> The ballot indicates a vote selection for the first party selection in the straight party contest.</p> <p><i>Actual:</i> The ballot indicated a vote selection for the first party selection in the straight party contest.</p>

Op Scan

1110	<p>On the first "N of M" contest, select the first partisan candidate that is associated with the first straight party selection. Leave the remainder of the selections under voted.</p> <p><i>Expected:</i> The selected candidate should be the only selection marked.</p> <p><i>Actual:</i> The selected candidate was the only selection marked.</p>
1120	<p>Review the ballot to verify that the above selections are marked.</p> <p><i>Expected:</i> The correct selections are marked appropriately.</p> <p><i>Actual:</i> The correct selections were marked appropriately.</p>
1130	<p>Cast the ballot on the Optical Scan precinct tabulation device.</p> <p><i>Expected:</i> The ballot is cast successfully.</p> <p><i>Actual:</i> The ballot was cast successfully.</p>
1140	<p>Close the polls and print the closed polls report tape.</p> <p><i>Expected:</i> The polls closed and a report is printed.</p> <p><i>Actual:</i> The polls were closed and a report was printed.</p>
1150	<p>Review the closed polls report to ensure all selections input above are recorded and reported correctly.</p> <p><i>Expected:</i> The closed polls report presents the accumulated totals for the selections input above.</p> <p><i>Actual:</i> The closed polls report presented the accumulated totals for the selections input above.</p>
<p>Criteria for Evaluation of the Test Results: The intended selections input above are recorded, stored, and reported as input by the tester. The process of selecting a candidate of the same party or of a different party of the straight party selection de-selects all candidates for the straight party vote.</p>	

Op Scan

Test Case Identifier: 04 – 25 P.S. § 3031.7(4) Straight Party and Write-In	
PAST 25 P.S. § 3031.7 Requirements:	<i>(4) Permits each voter, at other than primary elections, to vote a ticket selected from the nominees of any and all political parties, from the nominees of any and all political bodies, and from any persons whose names are not in nomination and do not appear upon the official ballot.</i>
Test Objective: To determine if the voting system supports straight party voting and write-in.	Test Configuration: Optical Scan Precinct tabulation device configured as described for normal election day operation by Pennsylvania procedures and/or the device manufacturer.
Test Equipment:	None
Special Procedural Requirements:	None
Assumptions:	An election is loaded on the device and the polls are open, ready for voting.
Step	Description
1000	<p>Obtain a blank ballot.</p> <p><i>Expected:</i> The ballot is blank and the vote selections can be made.</p> <p><i>Actual:</i> The ballot was blank and the vote selections could be made.</p>
1010	<p>Vote for the option for the first party selection of the straight party. The ballot must be marked in such a way as to meet the manufacturer's given criteria for a mark (for example, the oval must be completely filled in with an appropriate marking utensil).</p> <p><i>Expected:</i> The ballot indicates a vote selection for the first party selection in the straight party contest.</p> <p><i>Actual:</i> The ballot indicated a vote selection for the first party selection in the straight party contest.</p>
1020	<p>Review the ballot to verify that the above selection is marked.</p> <p><i>Expected:</i> The correct selection is marked appropriately.</p> <p><i>Actual:</i> The correct selection was marked appropriately.</p>
1030	<p>Cast the ballot on the Optical Scan precinct tabulation device.</p> <p><i>Expected:</i> The ballot is cast successfully.</p> <p><i>Actual:</i> The ballot was cast successfully.</p>
1040	<p>Obtain a blank ballot.</p> <p><i>Expected:</i> The ballot is blank and the vote selections can be made.</p> <p><i>Actual:</i> The ballot was blank and the vote selections could be made.</p>

Op Scan

1050	<p>Vote for the option for the first party selection of the straight party. The ballot must be marked in such a way as to meet the manufacturer's given criteria for a mark (for example, the oval must be completely filled in with an appropriate marking utensil).</p> <p><i>Expected:</i> The ballot indicates a vote selection for the first party selection in the straight party contest.</p> <p><i>Actual:</i> The ballot indicated a vote selection for the first party selection in the straight party contest.</p>
1060	<p>On the first partisan contest, mark the ballot to indicate a write-in and input John Doe as the write-in name.</p> <p><i>Expected:</i> The "Write-In" candidate John Doe appears.</p> <p><i>Actual:</i> The "Write-In" candidate John Doe appeared.</p>
1070	<p>Cast the ballot on the Optical Scan precinct tabulation device.</p> <p><i>Expected:</i> The ballot is cast successfully.</p> <p><i>Actual:</i> The ballot was cast successfully.</p>
1080	<p>Obtain a blank ballot.</p> <p><i>Expected:</i> The ballot is blank and the vote selections can be made.</p> <p><i>Actual:</i> The ballot was blank and the vote selections could be made.</p>
1090	<p>Vote for the option for the first party selection of the straight party. The ballot must be marked in such a way as to meet the manufacturer's given criteria for a mark (for example, the oval must be completely filled in with an appropriate marking utensil).</p> <p><i>Expected:</i> The ballot indicates a vote selection for the first party selection in the straight party contest.</p> <p><i>Actual:</i> The ballot indicated a vote selection for the first party selection in the straight party contest.</p>
1100	<p>On the first "Question" contest, mark both the "Yes" option and the "No" option (to over vote the ballot).</p> <p><i>Expected:</i> Both the "Yes" and "No" options are marked.</p> <p><i>Actual:</i> Both the "Yes" and "No" options were marked.</p>
1110	<p>Cast the ballot on the optical scan tabulation device.</p> <p><i>Expected:</i> The precinct tabulation device displays or provides an indication of an attempt to over vote. The precinct tabulation device might disallow the selection and not display any communication.</p> <p><i>Actual:</i> The precinct tabulation device displayed and provided an indication of an attempt to over vote.</p>

Op Scan

1120	<p>Close the polls and print the closed polls report tape.</p> <p><i>Expected:</i> The polls closed and a report is printed.</p> <p><i>Actual:</i> The polls were closed and a report was printed.</p>
1130	<p>Review the closed polls report to ensure all selections input above are recorded and reported correctly.</p> <p><i>Expected:</i> The closed polls report presents the accumulated totals for the selections input above.</p> <p><i>Actual:</i> The closed polls report presented the accumulated totals for the selections input above.</p>
<p>Criteria for Evaluation of the Test Results: The intended selections input above are recorded, stored, and reported as input by the tester. The functionality of selecting a write-in candidate functions with a straight party selection.</p>	

Op Scan

Test Case Identifier: 05 – 25 P.S. § 3031.7(5) Selection of Candidate and Write-in	
PASST 25 P.S. § 3031.7 Requirements:	(5) Permits each voter to vote for any person and any office for whom and for which he is lawfully entitled to vote, whether or not the name of such person appears upon the ballot as a candidate for nomination or election.
Test Objective: To determine if the voting system supports the selection of a candidate and a write-in candidate.	Test Configuration: Precinct tabulation device configured as described for normal election day operation by Pennsylvania procedures and/or the device manufacturer.
Test Equipment:	None
Special Procedural Requirements:	None
Assumptions:	An election is loaded on the device and the polls are open, ready for voting.
Step	Description
1000	Obtain a blank ballot. <i>Expected:</i> The ballot is blank and vote selections can be made. <i>Actual:</i> The ballot was blank and vote selections could be made.
1010	Vote for the option for the first candidate in the first partisan contest. The ballot must be marked in such a way as to meet the manufacturer's given criteria for a mark (for example, the oval must be completely filled in with an appropriate marking utensil). <i>Expected:</i> The ballot indicates a vote selection for the first candidate selection in the first partisan contest. <i>Actual:</i> The ballot indicated a vote selection for the first candidate selection in the first partisan contest.
1020	Review the ballot to verify that the above selection is marked. Cast the ballot on the Optical Scan precinct tabulation device. <i>Expected:</i> The correct selection is marked appropriately. The ballot is cast successfully. <i>Actual:</i> The correct selection was marked appropriately. The ballot was cast successfully.
1030	Obtain a blank ballot. <i>Expected:</i> The ballot is blank and vote selections can be made. <i>Actual:</i> The ballot was blank and vote selections could be made.
1040	Mark the option for a write-in candidate in the first partisan contest. Use the designed method to input "John Doe". <i>Expected:</i> A mark is made to indicate a vote selection for a write-in candidate with the name of "John Doe". <i>Actual:</i> A mark was made to indicate a vote selection for a write-in candidate with the name of "John Doe".
1050	Review the ballot, observing only the write-in candidate in the first partisan contest is marked. Use the designated method to cast the voted ballot. <i>Expected:</i> The ballot indicates the selection for only the write-in candidate "John Doe" in first partisan contests. After review, the ballot is cast successfully. <i>Actual:</i> The ballot indicated the selection for only the write-in candidate "John Doe" in first partisan contests. After review, the ballot was cast successfully.

Op Scan

1060	<p>Obtain a blank ballot.</p> <p><i>Expected:</i> The ballot is blank and vote selections can be made.</p> <p><i>Actual:</i> The ballot was blank and vote selections could be made.</p>
1070	<p>Mark the option for a write-in candidate in the first "N of M" contest. Use the designed method to input "John Doe" for all selections.</p> <p><i>Expected:</i> The ballot indicates write-in's of "John Doe."</p> <p><i>Actual:</i> The ballot indicated write-in's of "John Doe."</p>
1080	<p>Cast the ballot on the Optical Scan precinct tabulation device.</p> <p><i>Expected:</i> The ballot is cast successfully.</p> <p><i>Actual:</i> The ballot was cast successfully.</p>
1090	<p>Close the polls and print the closed polls report tape.</p> <p><i>Expected:</i> The polls closed and a report is printed.</p> <p><i>Actual:</i> The polls were closed and a report was printed.</p>
1100	<p>Review the closed polls report to ensure all selections input above are recorded and reported correctly.</p> <p><i>Expected:</i> The closed polls report presents the accumulated totals for the selections input above.</p> <p><i>Actual:</i> The closed polls report presented the accumulated totals for the selections input above.</p>
<p>Criteria for Evaluation of the Test Results: The intended selections input above are recorded, stored, and reported as input by the tester. The functionality of selecting a candidate and a write-in candidate functions.</p>	

Op Scan

Test Case Identifier: 07- 25 P.S. § 3031.7(7) Attempt to Over Vote Contests and Questions	
PAST 25 P.S. § 3031.7 Requirements:	<i>(7) If it is of a type that registers the vote electronically, the voting system shall preclude each voter from voting for more persons for any office than he is entitled to vote for or upon any question more than once.</i>
Test Objective: To determine if the voting device allows over voting on contests and questions	Test Configuration: Precinct tabulation device configured as described for normal election day operation by Pennsylvania procedures and/or the device manufacturer.
Equipment:	None
Special Procedural Requirements:	None
Assumptions:	An election is loaded on the device and the polls are open, ready for voting.
Step	Description
1000	<p>Obtain a blank ballot.</p> <p><i>Expected:</i> The ballot is blank and vote selections can be made.</p> <p><i>Actual:</i> The ballot was blank and vote selections could be made.</p>
1010	<p>Vote for the first candidate in the first partisan "1 of 1" contest excluding a straight party contest. The ballot must be marked in such a way as to meet the manufacturer's given criteria for a mark (for example, the oval must be completely filled in with an appropriate marking utensil).</p> <p><i>Expected:</i> The ballot indicates a vote selection for the first candidate in the first partisan "1 of 1" contest excluding a straight party contest.</p> <p><i>Actual:</i> The ballot indicated a vote selection for the first candidate in the first partisan "1 of 1" contest excluding a straight party contest.</p>
1020	<p>Vote for the second candidate in the first partisan "1 of 1" contest ensure the contest is the same contest as voted in step 1010.</p> <p><i>Expected:</i> The ballot indicates a vote selection for the second candidate in the first partisan "1 of 1" contest excluding a straight party contest.</p> <p><i>Actual:</i> The ballot indicated a vote selection for the second candidate in the first partisan "1 of 1" contest excluding a straight party contest.</p>
1030	<p>Attempt to cast the ballot on the Optical Scan precinct tabulation device.</p> <p><i>Expected:</i> The ballot is rejected due to the over-vote condition. The precinct tabulation device displays or provides an indication of an attempt to over vote.</p> <p><i>Actual:</i> The ballot was rejected due to the over-vote condition. The precinct tabulation device displayed and provided an indication of an attempt to over vote.</p>
1040	<p>Obtain a blank ballot.</p> <p><i>Expected:</i> The ballot is blank and vote selections can be made.</p> <p><i>Actual:</i> The ballot was blank and vote selections could be made.</p>

Op Scan

1050	<p>Vote for the second candidate in the first partisan "1 of 1" contest.</p> <p><i>Expected:</i> The ballot indicates a vote selection for the second candidate in the first partisan "1 of 1" contest excluding a straight party contest.</p> <p><i>Actual:</i> The ballot indicated a vote selection for the second candidate in the first partisan "1 of 1" contest excluding a straight party contest.</p>
1060	<p>Mark the write-in option for the same contest as in step 1050 and input the write-in "John Doe".</p> <p><i>Expected:</i> The ballot indicates a vote selection for the write-in.</p> <p><i>Actual:</i> The ballot indicated a vote selection for the write-in.</p>
1070	<p>Attempt to cast the ballot on the Optical Scan precinct tabulation device.</p> <p><i>Expected:</i> The ballot is rejected due to the over-vote condition. The precinct tabulation device displays or provides an indication of an attempt to over vote.</p> <p><i>Actual:</i> The ballot was rejected due to the over-vote condition. The precinct tabulation device displayed and provided an indication of an attempt to over vote.</p>
1080	<p>Obtain a blank ballot.</p> <p><i>Expected:</i> The ballot is blank and vote selections can be made.</p> <p><i>Actual:</i> The ballot was blank and vote selections could be made.</p>
1090	<p>On to the first "N of M" contest, mark the first "N" candidates in the contest. (e.g. in a Vote for Two contest the first two candidates would be marked).</p> <p><i>Expected:</i> The ballot indicates a vote for the first "N" candidates in the first "N of M" contest.</p> <p><i>Actual:</i> The ballot indicated a vote for the first "N" candidates in the first "N of M" contest.</p>
1100	<p>Mark the "N+1" candidate in the first "N of M" contest. Ensure the contest is the same contest as voted in step 1090.</p> <p><i>Expected:</i> The ballot indicates a vote for the "N+1" candidate.</p> <p><i>Actual:</i> The ballot indicated a vote for the "N+1" candidate.</p>
1110	<p>Attempt to cast the ballot on the Optical Scan precinct tabulation device.</p> <p><i>Expected:</i> The ballot is rejected due to the over-vote condition. The precinct tabulation device displays or provides an indication of an attempt to over vote.</p> <p><i>Actual:</i> The ballot was rejected due to the over-vote condition. The precinct tabulation device displayed and provided an indication of an attempt to over vote.</p>

Op Scan

1120	<p>Obtain a blank ballot.</p> <p><i>Expected:</i> The ballot is blank and vote selections can be made.</p> <p><i>Actual:</i> The ballot was blank and vote selections could be made.</p>
1130	<p>On the first "Question" contest, mark the "Yes" option in the contest.</p> <p><i>Expected:</i> The ballot indicates a vote for the "Yes" option in the first "Question" contest.</p> <p><i>Actual:</i> The ballot indicated a vote for the "Yes" option in the first "Question" contest.</p>
1140	<p>Mark the "No" option in the first "Question" contest. Ensure the contest is the same contest as voted in step 1130.</p> <p><i>Expected:</i> The ballot indicates a vote for the "No" option in the first "Question" contest.</p> <p><i>Actual:</i> The ballot indicated a vote for the "No" option in the first "Question" contest.</p>
1150	<p>Attempt to cast the ballot on the Optical Scan precinct tabulation device.</p> <p><i>Expected:</i> The ballot is rejected due to the over-vote condition. The precinct tabulation device displays or provides an indication of an attempt to over vote.</p> <p><i>Actual:</i> The ballot was rejected due to the over-vote condition. The precinct tabulation device displayed and provided an indication of an attempt to over vote.</p>
1160	<p>Close the polls and print the closed polls report tape.</p> <p><i>Expected:</i> The polls closed and a report is printed.</p> <p><i>Actual:</i> The polls were closed and a report was printed.</p>
1170	<p>Review the closed polls report to ensure no votes are recorded and no ballots were scanned.</p> <p><i>Expected:</i> The closed polls report indicates zero totals.</p> <p><i>Actual:</i> The closed polls report indicated zero totals.</p>
<p>Criteria for Evaluation of the Test Results: The intended selections input above are recorded, stored, and reported as input by the tester. The attempts to select more persons than the vote for and any question more than once are unsuccessful.</p>	

Op Scan

Test Case Identifier: 10 – 25 P.S. § 3031.7(10) Ballot Review and Change	
PA ST 25 P.S. § 3031.7 Requirements:	<p>(10) If it is of a type that registers the vote electronically, the voting system shall permit each voter to change his vote for any candidate or upon any question appearing on the official ballot up to the time that he takes the final step to register his vote and to have his vote computed.</p> <p>If it is of a type that uses paper ballots or ballot cards to register the vote and automatic tabulating equipment to compute such votes, the system shall provide that a voter who spoils his ballot may obtain another ballot; any ballot thus returned shall be immediately cancelled and at the close of the polls shall be enclosed in an envelope marked "Spoiled" which shall be sealed and returned to the county board.</p>
Test Objective: To determine if the voting device allows the voter to review the selections and change a vote selection before cast of the ballot.	Test Configuration: Precinct tabulation device configured as described for normal election day operation by Pennsylvania procedures and/or the device manufacturer.
Test Equipment:	None
Special Procedural Requirements:	None
Assumptions:	An election is loaded on the device and the polls are open, ready for voting.
Step	Description
1000	<p>Obtain a ballot for voting</p> <p><i>Expected:</i> The ballot is blank and vote selections can be made.</p> <p><i>Actual:</i> The ballot was blank and vote selections could be made.</p>
1010	<p>Vote for the first candidate in the first all "1 of 1" contest excluding a straight party contest, the first "N" candidates in all "N of M" contests, and select the "Yes" option in all "Question" contests. The ballot must be marked in such a way as to meet the manufacturer's given criteria for a mark (for example, the oval must be completely filled in with an appropriate marking utensil).</p> <p><i>Expected:</i> The ballot indicates selections as described above.</p> <p><i>Actual:</i> The ballot indicated selections as described above.</p>
1020	<p>Cast the ballot on the optical scan precinct tabulation device.</p> <p><i>Expected:</i> The ballot is cast successfully.</p> <p><i>Actual:</i> The ballot was cast successfully.</p>
1030	<p>Obtain a ballot for voting</p> <p><i>Expected:</i> The ballot is blank and vote selections can be made.</p> <p><i>Actual:</i> The ballot was blank and vote selections could be made.</p>
1040	<p>Vote for the first candidate in the first all "1 of 1" contest excluding a straight party contest, the first "N" candidates in all "N of M" contests, and select the "Yes" option in all "Question" contests. The ballot must be marked in such a way as to meet the manufacturer's given criteria for a mark (for example, the oval must be completely filled in with an appropriate marking utensil).</p> <p><i>Expected:</i> The ballot indicates selections as described above.</p> <p><i>Actual:</i> The ballot indicated selections as described above.</p>

Op Scan

1050	<p>Using the designated method, spoil the ballot.</p> <p><i>Expected:</i> The ballot is successfully spoiled and placed in the appropriate envelope.</p> <p><i>Actual:</i> The ballot was successfully spoiled and placed in the appropriate envelope.</p>
1070	<p>Obtain a ballot for voting to replace the ballot spoiled in Step 1050.</p> <p><i>Expected:</i> The ballot is blank and vote selections can be made.</p> <p><i>Actual:</i> The ballot was blank and vote selections could be made.</p>
1080	<p>Vote for the first candidate in the first all "1 of 1" contest excluding a straight party contest, the first "N" candidates in all "N of M" contests, and select the "No" option in all "Question" contests. The ballot must be marked in such a way as to meet the manufacturer's given criteria for a mark (for example, the oval must be completely filled in with an appropriate marking utensil).</p> <p><i>Expected:</i> The ballot indicates selections as described above.</p> <p><i>Actual:</i> The ballot indicated selections as described above.</p>
1090	<p>Cast the ballot on the optical scan precinct tabulation device.</p> <p><i>Expected:</i> The ballot is cast successfully.</p> <p><i>Actual:</i> The ballot was cast successfully.</p>
1100	<p>Close the polls and print the closed polls report tape.</p> <p><i>Expected:</i> The polls closed and a report is printed.</p> <p><i>Actual:</i> The polls were closed and a report was printed.</p>
1090	<p>Review the closed polls report to ensure all selections input above are recorded and reported correctly. The results should indicate two votes for the first candidate in the first all "1 of 1" contest excluding a straight party contest, two votes for the first "N" candidates in all "N of M" contests, and one vote for the "Yes" option and one vote for "No" option in all "Question" contests.</p> <p><i>Expected:</i> The closed polls report presents the accumulated totals for the selections input above.</p> <p><i>Actual:</i> The closed polls report presented the accumulated totals for the selections input above.</p>
<p>Criteria for Evaluation of the Test Results: The intended selections input above are recorded, stored, and reported as input by the tester. The voter input can be changed by navigating through the ballot after a ballot has been reviewed.</p>	

Test Case Identifier: 16 – 25 P.S. § 3031.7(16) Public Counter, No Reopening of Polls, Media Security with Tamper Proof Locks and Zero Proof and Tally Reports.	
P.A.S.T. 25 P.S. § 3031.7 Requirements:	<p>(16) If the voting system is of a type which provides for the computation and tabulation of votes at the district level, the district component of the automatic tabulating equipment shall include the following mechanisms or capabilities:</p> <p>(i) A public counter, the register of which is visible from the outside of the automatic tabulating equipment component into which the ballots are entered, which shall show during any period of operation the total number of ballots entered for computation and tabulation.</p> <p>(ii) A lock, or locks, by the use of which all operation of the tabulation element of the automatic tabulating equipment is absolutely prevented immediately after the polls are closed or where the tabulation of votes is completed.</p> <p>(iii) It shall be so constructed and controlled that, during the progress of voting, it shall preclude every person from seeing or knowing the number of votes theretofore registered for any candidate or question; and it shall preclude every person from tampering with the tabulating element.</p> <p>(iv) If the number of choices recorded for any office or on any question exceeds the number for which the voter is entitled to vote, it shall reject all choices recorded on the ballot for that office or question, provided, that if used during the period of voting it may also have the capacity to indicate to a voter that he has improperly voted for more candidates for any office than he is entitled to vote for, and in such case it shall have the capacity to permit the voter to mark a new ballot or to forego his opportunity to make such correction.</p> <p>(v) It shall be equipped with an element which generates a printed record at the beginning of its operation which verifies that the tabulating elements for each candidate position and each question and the public counter are all set to zero and with an element which generates a printed record at the finish of its operation of the total number of voters whose ballots have been tabulated, the total number of votes cast for each candidate whose name appears on the ballot, and the total number of votes cast for, or against, any question appearing on the ballot.</p>
Test Objective: To determine if the voting device has a public counter, does not allow the reopening of the polls, and supplies a zero proof and tally report.	Test Configuration: Optical Scan Precinct tabulation device configured as described for normal election day operation by Pennsylvania procedures and/or the device manufacturer. This includes all security locks and seals.
Test Equipment:	None
Special Procedural Requirements:	None
Assumptions:	The election media is installed but the polls have not been opened.
Step	Description
1000	<p>Ensure media is loaded but the polls have not been opened. Use the designated method to open polls. If a response is needed to print "Zero Proof" report, select this option.</p> <p><i>Expected:</i> The optical scan precinct tabulation device opens the polls and prints a "Zero Proof" report.</p> <p><i>Actual:</i> The optical scan precinct tabulation device opened the polls and printed a "Zero Proof" report.</p>
1010	<p>Obtain a blank ballot.</p> <p><i>Expected:</i> The ballot is blank and vote selections can be made.</p> <p><i>Actual:</i> The ballot was blank and vote selections could be made.</p>

Op Scan

1020	<p>On the straight party contest, mark the first selection in the straight party contest.</p> <p><i>Expected:</i> The ballot indicates a vote selection for the first selection in the straight party contest.</p> <p><i>Actual:</i> The ballot indicated a vote selection for the first selection in the straight party contest.</p>
1030	<p>Proceed to the optical scan precinct tabulation device. Observe the public counter value being 0.</p> <p><i>Expected:</i> The optical scan precinct tabulation device's public counter is visible and the value is 0.</p> <p><i>Actual:</i> The optical scan precinct tabulation device's public counter was visible and the value was 0.</p>
1040	<p>Cast the ballot. Observe the acknowledgement of "successful" ballot cast, if provided. Observe the public counter incrementing by one.</p> <p><i>Expected:</i> The optical scan precinct tabulation device successfully cast the ballot and the public counter is incremented. If the ballot was not cast successfully the test is halted.</p> <p><i>Actual:</i> The optical scan precinct tabulation device successfully cast the ballot and the public counter was incremented.</p>
1050	<p>Close the polls and print the closed polls report tape.</p> <p><i>Expected:</i> The polls closed and a report is printed.</p> <p><i>Actual:</i> The polls were closed and a report was printed.</p>
1060	<p>Use the designated method to attempt to reopen the polls.</p> <p><i>Expected:</i> The polls cannot be reopened.</p> <p><i>Actual:</i> The polls could not be reopened.</p>
1070	<p>Place lock on the optical scan precinct tabulation device per Pennsylvania Procedures to ensure all operation of the tabulation element is prevented.</p> <p><i>Expected:</i> The optical scan precinct tabulation device can be secured so that all operation of the tabulation element is prevented.</p> <p><i>Actual:</i> The optical scan precinct tabulation device was secured so that all operation of the tabulation element was prevented.</p>

Op Scan

1070	<p>Review the closed polls report to ensure all selections input above are recorded and reported correctly.</p> <p><i>Expected:</i> The closed polls report presents the accumulated totals for the selections input above.</p> <p><i>Actual:</i> The closed polls report presented the accumulated totals for the selections input above.</p>
<p>Criteria for Evaluation of the Test Results: The intended selections input above are recorded, stored, and reported as input by the tester. The voting device is able to produce a “Zero Proof” and “Tally Report”. The voting device has a visible public counter and the counter increments correctly.</p>	

APPENDIX B
HARDWARE TEST REPORTS
(provided separately)

APPENDIX C
AS RUN TEST PLAN
(provided separately)